

TEXT SEARCH

=&gt; d his 175

(FILE 'HCAPLUS' ENTERED AT 13:10:01 ON 08 MAR 2010)

L75 32 S L72 OR L74  
 SAV TEMP L75 HAN124HCPA/A

=&gt; d que 175

L3 8586 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON (LI(L)CO(L)O)  
 /ELS  
 L4 QUE SPE=ON ABB=ON PLU=ON A2/PG  
 L5 QUE SPE=ON ABB=ON PLU=ON B4/PG  
 L6 118 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L3 AND L4  
 AND L5  
 L9 31 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON L6 AND  
 MG/ELS AND ZR/ELS  
 L11 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON 872-36-6/RN  
 L12 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON 77-77-0/RN  
 L16 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON "1,4-BUTANEDI  
 OL, 1,4-DIMETHANESULFONATE"/CN  
 L17 32059 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON BATTERY (3A) ELE  
 CTROLYTE  
 L18 54 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L9  
 L20 98972 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON BATTERY (3A) (SE  
 CONDARY OR LITHIUM)  
 L22 123 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L6  
 L23 52 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND L17  
 L24 1602 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L11  
 L25 SEL PLU=ON L11 1- NAME : 5 TERMS  
 L26 1977 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L25  
 L27 2059 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L24 OR L26  
 L28 15 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L27 AND L23  
 L29 1165 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L12  
 L30 SEL PLU=ON L12 1- NAME : 8 TERMS  
 L31 3551 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L30  
 L32 3947 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L29 OR L31  
 L33 2849 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L16  
 L34 SEL PLU=ON L16 1- NAME : 37 TERMS  
 L35 3059 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L34  
 L36 3428 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L33 OR L35  
 L37 1 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND (L36  
 OR L32)  
 L38 17 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND L27  
 L39 1 SEA FILE=REGISTRY SPE=ON ABB=ON PLU=ON 105-58-8/RN  
 L40 7146 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L39  
 L41 SEL PLU=ON L39 1- NAME : 9 TERMS  
 L42 40945 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L41  
 L43 41939 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L40 OR L42  
 L44 20 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND L43  
 L45 1 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND L32  
 L46 0 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L22 AND L36  
 L47 56 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L23 OR L28 OR  
 L37 OR L38 OR (L44 OR L45 OR L46)  
 L49 QUE SPE=ON ABB=ON PLU=ON PY=<2005 NOT P/DT  
 L50 QUE SPE=ON ABB=ON PLU=ON (PY=<2005 OR PRY=<2005 OR  
 AY=<2005 OR MY=<2005 OR REVIEW/DT) AND P/DT  
 L51 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L47 AND (L49  
 OR L50)  
 L52 QUE SPE=ON ABB=ON PLU=ON BATTER? OR (ELECTROCHEM? O  
 R ELECTROLY? OR GALVAN? OR WET OR DRY OR PRIMARY OR SEC  
 ONDARY) (2A) (CELL OR CELLS)  
 L53 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L51 AND (L52  
 OR L20)  
 L54 31 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L53 AND

# 10/563,124-324074-EIC SEARCH

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(ELECTROLYT? OR L17)
L55 19 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L54 AND L18
L56 31 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L54 OR L55
L57 QUE SPE=ON ABB=ON PLU=ON ELECTROD? OR ELECTROD?(2A)
(POSITIVE OR NEGATIVE) OR CATHOD? OR ANOD?
L58 31 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L56 AND L57
L59 QUE SPE=ON ABB=ON PLU=ON ACTIVE(3A) (MATERIAL OR SUB
STANCE)
L60 QUE SPE=ON ABB=ON PLU=ON NONAQUEOUS OR NON(A)AQUEOU
S
L61 QUE SPE=ON ABB=ON PLU=ON GROUP(2A) (II OR IV)
L62 27 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L58 AND (L59
OR L60 OR L61)
L63 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L58 NOT L62
L64 31 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L58 OR L62 OR
L63
L65 QUE SPE=ON ABB=ON PLU=ON ?PERCENT? OR .PERCENT. OR
FER(W)CENT? OR PCT? OR RATIO# OR PROPORTION? OR PART
L66 QUE SPE=ON ABB=ON PLU=ON MOL OR WEIGHT
L67 1 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L53 NOT L64
L68 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L64 OR L67
L69 12 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L68 AND (L65
OR L66)
L70 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L68 OR L69
L71 19 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 AND L18
L72 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L70 OR L71
L73 QUE SPE=ON ABB=ON PLU=ON VOLT OR VOLTAGE
L74 4 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L72 AND L73
L75 32 SEA FILE=HCAPLUS SPE=ON ABB=ON PLU=ON L72 OR L74

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## TEXT SEARCH RESULTS

=&gt; d 175 1-32 ibib ed abs hitstr hitind

L75 ANSWER 1 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2007:664302 HCAPLUS Full-text  
 DOCUMENT NUMBER: 147:55492  
 TITLE: Cathode active mass, its  
 manufacture, cathodes, and  
 secondary nonaqueous-  
 electrolyte batteries  
 INVENTOR(S): Tatsumi, Koji; Amagasaki, Yukiko; Imafuku,  
 Yoko  
 PATENT ASSIGNEE(S): Agc Seimi Chemical Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 13pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2007157596	A	20070621	JP 2005-353966	2005 1207

PRIORITY APPLN. INFO.: <--  
 JP 2005-353966  
 2005  
 1207

ED Entered STN: 21 Jun 2007  
 AB The title cathode mass contains Li, Co, and Zr, where 30-95 mol% the Zr is contained as Zr oxide to give 5-70 mol% Li mixed oxides. The cathode mass is manufactured by mixing raw materials and then firing, where the fired powders contain insol. components while bringing the powders into contact with 18% aqueous HCl solution at 225°. The insol. components contain 30-95 mol% of the Zr. The cathode is equipped with the active mass, a conductive material, and a binder. The secondary battery equipped with the cathode provides high capacity under high voltage and long cycle life.  
 IT 756879-33-1  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (zirconium-containing mixed oxide in manufacture of active mass for cathodes and secondary nonaq.-electrolyte batteries)  
 RN 756879-33-1 HCAPLUS  
 CN Aluminum cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2
Al	x	7429-90-5

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST zirconium lithium mixed oxide cathode manuf  
 secondary nonaq battery  
 IT Secondary batteries  
 (lithium; zirconium-containing mixed oxide in manufacture of  
 active mass for cathodes and secondary  
 nonaq.-electrolyte batteries)  
 IT Battery cathodes

## 10/563,124-324074-EIC SEARCH

(zirconium-containing mixed oxide in manufacture of active mass for cathodes and secondary nonaq.-electrolyte batteries)

IT 1314-23-4, Zirconium oxide, uses 756879-33-1  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (zirconium-containing mixed oxide in manufacture of active mass for cathodes and secondary nonaq.-electrolyte batteries)

L75 ANSWER 2 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2007:117698 HCAPLUS Full-text

DOCUMENT NUMBER: 146:209722

TITLE: Battery

INVENTOR(S): Obana, Yoshiaki; Tokunaga, Takashi; Akashi,

Hiroyuki

PATENT ASSIGNEE(S): Sony Corporation, Japan

SOURCE: U.S. Pat. Appl. Publ., 21pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20070026311	A1	20070201	US 2006-459514	2006 0724
JP 2007059379	A	20070308	JP 2006-141036	2006 0522
KR 2007015059	A	20070201	KR 2006-71264	2006 0728
CN 1917276	A	20070221	CN 2006-10136308	2006 0731
PRIORITY APPLN. INFO.:			JP 2005-222195	A 2005 0729
			JP 2006-141036	A 2006 0522

# ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 02 Feb 2007

AB A battery capable of improving the charge and discharge efficiency even when the battery voltage is set to over 4.2 V is provided. A cathode and an anode are oppositely arranged with an electrolyte and a separator in between. The open circuit voltage in full charge is in the range from 4.25 V to 6.00 V. The cathode has a cathode current collector and a cathode active material layer provided on the cathode current collector. The cathode active material layer contains, as a binder, a polymer with intrinsic viscosity of 2.0 dL/g to 10 dL/g which contains vinylidene fluoride as an element.

IT 872-36-6, Vinylene carbonate  
 868842-82-4

RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery with cathode containing binder)

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 868842-82-4 HCAPLUS  
 CN Aluminum cobalt lithium magnesium zirconium oxide  
 (Al<sub>0.01</sub>Co<sub>0.97</sub>LiMg<sub>0.01</sub>Zr<sub>0.01</sub>O<sub>2</sub>) (CA INDEX NAME)

Component	Ratio	Component
		Registry Number
O	2	17778-80-2
Zr	0.01	7440-67-7
Co	0.97	7440-48-4
Mg	0.01	7439-95-4
Li	1	7439-93-2
Al	0.01	7429-90-5

INCL 429217000; 429231300; 429223000; 429221000; 429231500; 429220000;  
 429229000; 429231600; 429338000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST battery cathode  
 IT Battery cathodes  
 (battery with cathode containing binder)  
 IT Carbonaceous materials (technological products)  
 Fluoropolymers, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery with cathode containing binder)  
 IT Secondary batteries  
 (lithium; battery with cathode  
 containing binder)  
 IT 193215-53-1P, Cobalt lithium manganese nickel oxide  
 (Co<sub>0.2</sub>LiMn<sub>0.3</sub>Ni<sub>0.5</sub>O<sub>2</sub>) 372492-00-7P, Aluminum cobalt lithium  
 magnesium oxide (Al<sub>0.01</sub>Co<sub>0.98</sub>LiMg<sub>0.01</sub>O<sub>2</sub>)  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered  
 material use); PREP (Preparation); USES (Uses)  
 (battery with cathode containing binder)  
 IT 872-36-6, Vinylene carbonate  
 9002-88-4, Polyethylene 9003-07-0, Polypropylene 24937-79-9,  
 Polyvinylidene fluoride 37323-13-0, Chromium cobalt  
 lithium oxide 104245-03-6, Cobalt lithium zinc  
 oxide 116713-67-8, Cobalt lithium titanium oxide  
 120479-28-9, Cobalt copper lithium oxide 131344-56-4,  
 Cobalt lithium nickel oxide 146956-50-5, Cobalt  
 lithium vanadium oxide 147683-99-6, Cobalt  
 lithium zirconium oxide 149087-95-6, Cobalt  
 lithium tin oxide 152654-50-7, Cobalt iron  
 lithium oxide 154838-53-6, Aluminum cobalt  
 lithium oxide 186298-15-7 186298-17-9 186298-22-6  
 187144-47-4, Calcium cobalt lithium oxide 187144-48-5,  
 Cobalt lithium magnesium oxide 214536-41-1, Cobalt  
 lithium manganese oxide 253875-52-4, Cobalt  
 lithium niobium oxide 253875-55-7, Cobalt  
 lithium strontium oxide 326895-11-8, Cobalt  
 lithium yttrium oxide 346417-97-8, Cobalt lithium  
 manganese nickel oxide (Co<sub>0.33</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>) 350580-22-2,  
 Cobalt lithium tungsten oxide 382151-87-3, Boron  
 cobalt lithium oxide 478037-17-1 483965-60-2, Cobalt  
 gallium lithium oxide 656812-56-5, Cobalt  
 lithium molybdenum oxide 824957-50-8 824957-51-9  
 855998-69-5 855998-70-8 855998-71-9 855998-72-0  
 863498-38-8 864452-44-8 868842-82-4 897031-15-1  
 897031-16-2 897031-18-4 922733-62-8 922733-63-9

## 10/563,124-324074-EIC SEARCH

922733-64-0

RL: TEM (Technical or engineered material use); USES (Uses)  
 (battery with cathode containing binder)

L75 ANSWER 3 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2006:1094429 HCAPLUS Full-text  
 DOCUMENT NUMBER: 145:401049  
 TITLE: Secondary batteries  
 containing lithium tetrafluoroborate  
 in nonaqueous electrolytes  
 , and method for charging the  
 batteries  
 INVENTOR(S): Tsutsumi, Shuji; Iwanaga, Masato; Oga,  
 Keisuke; Nishida, Nobumichi  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 14pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006286382	A	20061019	JP 2005-104283	2005 0331

PRIORITY APPLN. INFO.: <--  
 JP 2005-104283  
 <--  
 2005  
0331

ED Entered STN: 20 Oct 2006  
 AB The batteries have cathode active mass with potential (based on Li) 4.4-4.6 V  
 containing Zr- and Mg-containing LiCoO<sub>2</sub> and layered Li Mn Ni mixed oxides, and 0.05-  
 1.5% (based on weight of nonaq. electrolytes) LiBF<sub>4</sub> in nonaq. electrolytes. The  
 batteries show improved cycle efficiency and reduced swelling.  
 IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (cathode active mass; secondary  
 batteries containing lithium tetrafluoroborate in  
 nonaq. electrolytes)  
 RN 642999-33-5 HCAPLUS  
 CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IT 872-36-6, Vinylene carbonate  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (electrolyte additive; secondary  
 batteries containing lithium tetrafluoroborate in  
 nonaq. electrolytes)  
 RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



IT 105-58-8, Diethyl carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; secondary batteries  
 containing lithium tetrafluoroborate in nonaq.  
 electrolytes)  
 RN 105-58-8 HCAPLUS  
 CN Carbonic acid, diethyl ester (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte battery charging  
 cathode electrolyte; lithium  
 tetrafluoroborate nonaq electrolyte  
 battery; battery cathode cobalt  
 lithium magnesium zirconium oxide; cobalt lithium  
 manganese nickel oxide battery cathode  
 IT Secondary batteries  
 (lithium; secondary batteries  
 containing lithium tetrafluoroborate in nonaq.  
 electrolytes)  
 IT Battery cathodes  
 Battery electrolytes  
 (secondary batteries containing lithium  
 tetrafluoroborate in nonaq. electrolytes)  
 IT 532934-38-6P, Cobalt lithium manganese nickel oxide  
 (Co<sub>0.34</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>) 642999-33-5P, Cobalt lithium  
 magnesium zirconium oxide  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
 (Preparation); USES (Uses)  
 (cathode active mass; secondary  
 batteries containing lithium tetrafluoroborate in  
 nonaq. electrolytes)  
 IT 872-36-6, Vinylene carbonate  
 14283-07-9, Lithium tetrafluoroborate  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (electrolyte additive; secondary  
 batteries containing lithium tetrafluoroborate in  
 nonaq. electrolytes)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 623-53-0, Methyl ethyl  
 carbonate 21324-40-3, Lithium  
 hexafluorophosphate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; secondary batteries  
 containing lithium tetrafluoroborate in nonaq.  
 electrolytes)

L75 ANSWER 4 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2006:1094404 HCAPLUS Full-text  
 DOCUMENT NUMBER: 145:401047  
 TITLE: Secondary noneaqueous  
 electrolyte batteries bonded  
 with pressure-sensitive adhesive tapes, and

## 10/563,124-324074-EIC SEARCH

INVENTOR(S): method for charging the batteries  
 Obayashi, Atsushi  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 11pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2006286337	A	20061019	JP 2005-103173	2005 0331

PRIORITY APPLN. INFO.: <--  
 JP 2005-103173  
 2005  
 0331

ED Entered STN: 20 Oct 2006

AB The batteries have cathode active mass with potential (based on Li) 4.4-4.6 V containing (A) Zr- and Mg-containing Li Co mixed oxides and (B) layered Li Ni Mn mixed oxides, and pressure-sensitive adhesive tapes composed of substrate layers and rubber adhesive layers for protection, insulation, or prevention of unwinding of electrodes. The batteries have cathode active mass with improved thermal stability at high potential, and show improved safety and cycle efficiency.

IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
 (cathode active mass; secondary  
 nonaq. electrolyte batteries bonded  
 with pressure-sensitive adhesive tapes)

RN 642999-33-5 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IT 872-36-6, Vinylene carbonate

RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)

(electrolyte additive; secondary  
 nonaq. electrolyte batteries bonded  
 with pressure-sensitive adhesive tapes)

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte battery charging  
 cathode adhesive tape; battery cathode  
 cobalt lithium magnesium zirconium oxide; cobalt



lithium manganese nickel oxide battery  
cathode; pressure sensitive adhesive tape polypropylene  
isoprene rubber battery

IT Secondary batteries  
(lithium; secondary nonaq.  
electrolyte batteries bonded with  
pressure-sensitive adhesive tapes)

IT Isoprene rubber, uses  
RL: DEV (Device component use); USES (Uses)  
(pressure-sensitive adhesive; secondary nonaq.  
electrolyte batteries bonded with  
pressure-sensitive adhesive tapes)

IT Adhesive tapes  
Battery cathodes  
Battery electrolytes  
(secondary nonaq. electrolyte  
batteries bonded with pressure-sensitive adhesive  
tapes)

IT 182442-95-1P, Cobalt lithium manganese nickel oxide  
642999-33-3P, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)  
(cathode active mass; secondary  
nonaq. electrolyte batteries bonded  
with pressure-sensitive adhesive tapes)

IT 872-36-6, Vinylene carbonate  
RL: DEV (Device component use); MOA (Modifier or additive use);  
USES (Uses)  
(electrolyte additive; secondary  
nonaq. electrolyte batteries bonded  
with pressure-sensitive adhesive tapes)

IT 9003-31-0  
RL: DEV (Device component use); USES (Uses)  
(isoprene rubber, pressure-sensitive adhesive;  
secondary nonaq. electrolyte  
batteries bonded with pressure-sensitive adhesive  
tapes)

IT 9003-07-0, Polypropylene  
RL: DEV (Device component use); USES (Uses)  
(pressure-sensitive adhesive tape substrate; secondary  
nonaq. electrolyte batteries bonded  
with pressure-sensitive adhesive tapes)

L75 ANSWER 5 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
ACCESSION NUMBER: 2006:1094402 HCAPLUS Full-text  
DOCUMENT NUMBER: 145:401046  
TITLE: Secondary nonaqueous  
electrolyte batteries having  
cathode active mass with controlled  
size and shape, and method for charging the  
batteries

INVENTOR(S): Inoue, Hidetoshi; Nishida, Nobumichi  
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 12pp.  
CODEN: JKXXAF

DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2006286336	A	20061019	JP 2005-103172	2005 0331

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## 10/563,124-324074-EIC SEARCH

PRIORITY APPLN. INFO.:

JP 2005-103172

2005

0331

&lt;--

ED Entered STN: 20 Oct 2006  
 AB The batteries have cathode active mass with potential (based on Li) 4.4-4.6 V containing (A) Zr- and Mg-containing Li Co mixed oxides with average particle size (X) 7-30  $\mu$ m, and (B) layered Li Ni Mn mixed oxides having average particle size (Y) 2-15  $\mu$ m and aggregated spherical or elliptical shapes with ratio of minor axis/major axis 0.80-1.0, satisfying  $X/Y = 1.4-15$ . The batteries have cathode active mass with improved thermal stability at high potential, and show improved safety and cycle efficiency.  
 IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
 RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)  
     (cathode active mass; secondary  
     nonaq. electrolyte batteries having  
     cathode active mass with controlled size and shape)  
 RN 642999-33-5 HCAPLUS  
 CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte battery charging  
     cathode size shape; battery cathode  
     cobalt lithium magnesium zirconium oxide; cobalt  
     lithium manganese nickel oxide battery  
     cathode  
 IT Secondary batteries  
     (lithium; secondary nonaq.  
     electrolyte batteries having cathode  
     active mass with controlled size and shape)  
 IT Battery cathodes  
     (secondary nonaq. electrolyte  
     batteries having cathode active mass with  
     controlled size and shape)  
 IT 182442-95-1P, Cobalt lithium manganese nickel oxide  
     642999-33-5P, Cobalt lithium magnesium zirconium oxide  
     RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
     (Preparation); USES (Uses)  
     (cathode active mass; secondary  
     nonaq. electrolyte batteries having  
     cathode active mass with controlled size and shape)

L75 ANSWER 6 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2006:918270 HCAPLUS Full-text  
 DOCUMENT NUMBER: 145:274968  
 TITLE: Nonaqueous electrolyte  
         secondary battery  
 INVENTOR(S): Iwanaga, Masato; Nishida, Nobumichi; Tsutsumi,  
               Shuji  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 9pp.  
           CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

## 10/563,124-324074-EIC SEARCH

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20060199077	A1	20060907	US 2006-359965	2006 0223
JP 2006236725	A	20060907	JP 2005-48171	2005 0224
KR 2006094477	A	20060829	KR 2006-17530	2006 0223
CN 1825675	A	20060830	CN 2006-10009554	2006 0224
CN 100539291	C	20090909		
PRIORITY APPLN. INFO.:			JP 2005-48171	A 2005 0224

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 08 Sep 2006

AB The invention concerns a non-aqueous electrolyte secondary battery with excellent discharge cycle characteristics and a charging termination potential ranging from 4.4 to 4.6 V based on lithium, consisting of a pos. electrode comprising a pos. electrode active material, a neg. electrode, and a non-aqueous electrolyte containing a non-aqueous solvent and an electrolyte salt, in which the pos. electrode active material comprises a mixture of a lithium-cobalt composite oxide containing at least both zirconium and magnesium in LiCoO<sub>2</sub>, and a lithium-manganese-nickel composite oxide having a layered structure and containing at least both manganese and nickel, and the potential of the pos. electrode active material ranges from 4.4 to 4.6 V based on lithium, and the non-aqueous electrolyte contains at least one of aromatic compds. selected from the group consisting at least of toluene derivs., anisole derivs., biphenyl, cyclohexyl benzene, tert-Bu benzene, tert-amyl benzene, and di-Ph ether.

IT 105-58-8, Diethyl carbonate  
642999-33-5, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 642999-33-5 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IT 872-36-6, Vinylene carbonate

## 10/563,124-324074-EIC SEARCH

RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



INCL 429231300; 429231600; 429224000; 429223000; 429326000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST nonaq electrolyte secondary  
battery  
IT Battery cathodes  
Battery electrolytes  
Secondary batteries  
(nonaq. electrolyte secondary  
battery)  
IT Aromatic compounds  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)  
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
carbonate 623-53-0, Ethyl methyl carbonate  
162684-16-4, Lithium manganese nickel oxide 182442-95-1, Cobalt  
lithium manganese nickel oxide 532934-38-6, Cobalt lithium  
manganese nickel oxide (Co<sub>0.34</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>)  
642999-33-3, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)  
IT 92-52-4, Biphenyl, uses 98-06-6, tert-Butylbenzene 100-66-3D,  
Anisole, derivative 101-84-8, Diphenyl ether 108-88-3D, Toluene,  
derivative 827-52-1, Cyclohexylbenzene 872-36-6,  
Vinylene carbonate 2049-95-8, tert-Amylbenzene  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)

L75 ANSWER 7 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
ACCESSION NUMBER: 2006:890059 HCAPLUS Full-text  
DOCUMENT NUMBER: 145:274867  
TITLE: Nonaqueous electrolyte  
secondary battery  
INVENTOR(S): Ooga, Keisuke; Iwanaga, Masato; Inomata,  
Hideyuki; Ohshita, Ryuji  
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
SOURCE: U.S. Pat. Appl. Publ., 6 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20060194111	A1	20060831	US 2006-362225	2006 0227
JP 2006244723	A	20060914	JP 2005-54381	

## 10/563,124-324074-EIC SEARCH

2005  
0228

KR 2006095462 A 20060831 KR 2006-15179

2006  
0216

CN 1848511 A 20061018 CN 2006-10051464

2006  
0228

CN 100508272 C 20090701

PRIORITY APPLN. INFO.: JP 2005-54381 A

2005  
0228

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STM: 01 Sep 2006

AB A non-aqueous electrolyte secondary cell excellent in cycle characteristics is provided. This purpose is achieved by the following structure. A non-aqueous electrolyte secondary cell has a pos. electrode having a pos. electrode active material, a neg. electrode having a neg. electrode active material, and a non-aqueous electrolyte having a non-aqueous solvent and an electrolytic salt. The pos. electrode active material has a lithium-cobalt compound oxide having added therein at least zirconium. The non-aqueous electrolyte has LiBF<sub>4</sub> at from 0.05 to 1.0 mass% of a total mass of the non-aqueous electrolyte and unsatd. cyclic carbonate at from 1.0 to 4.0 mass%. The true d. ratio of the pos. electrode is 0.72 or greater, the true d. ratio being represented by formula 1 shown below: (Formula 1) True d. ratio=active material apparent d. of electrode active material layer/true d. of active material.

IT 105-58-8, Diethyl carbonate  
872-36-6, Vinylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); SPH (Synthetic preparation); PREP (Preparation); USES (Uses)  
(nonaq. electrolyte secondary battery)

RN 642999-33-5 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component | Ratio | Component

## 10/563,124-324074-EIC SEARCH

		Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

INCL 429231300; 429231600

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq electrolyte secondary  
batteryIT Battery cathodes  
Secondary batteries  
(nonaq. electrolyte secondary  
battery)IT Fluoropolymers, uses  
Styrene-butadiene rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
carbonate 623-53-0, Ethyl methyl carbonate  
872-36-6, Vinylene carbonate  
7429-90-5, Aluminum, uses 7782-42-5, Graphite, uses 7791-03-9  
14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium  
hexafluorophosphate 52627-24-4, Cobalt lithium oxide  
90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(nonaq. electrolyte secondary  
battery)IT 98-06-6, tert-Butylbenzene 827-52-1, Cyclohexylbenzene  
7439-95-4, Magnesium, uses 7440-44-0, Carbon, uses 7440-67-7,  
Zirconium, uses 9000-11-7, CMC 24937-79-9, PvdF  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)IT 9003-55-8  
RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber; nonaq. electrolyte  
secondary battery)

L75 ANSWER 8 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2006:889999 HCAPLUS Full-text

DOCUMENT NUMBER: 145:274866

TITLE: Charging method of nonaqueous  
electrolyte secondary  
battery

INVENTOR(S): Miyazaki, Shinya; Nishida, Nobumichi

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: U.S. Pat. Appl. Publ., 12pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20060194110	A1	20060831	US 2006-355183	2006

## 10/563,124-324074-EIC SEARCH

0216

JP 2006228651 A 20060831 JP 2005-43545

2005

0221

KR 2006093293 A 20060824 KR 2006-16118

2006

0220

CN 1825674 A 20060830 CN 2006-10008693

2006

0221

PRIORITY APPLN. INFO.: JP 2005-43545 A 2005

0221

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STIN: 01 Sep 2006

AB A non-aqueous electrolyte secondary battery with excellent cycle characteristics and thermal stability in which the potential of the pos. electrode active material ranges from 4.4 V to 4.6 V based on lithium, and-charging method therefor are provided, wherein the pos. electrode active substance of a non-aqueous electrolyte secondary battery comprises a hexagonal system of lithium-containing transition metal composite oxide formed by adding zirconium, magnesium, and aluminum as foreign elements upon synthesis of lithium cobalt oxide, with zirconium content ranging from 0.01 to 1 mol%, magnesium content ranging from 0.01 to 3 mol%, and aluminum content ranging from 0.01 to 3 mol%, and an Li/Co molar ratio ranging from 1.00 to 1.05.

IT 105-58-8, Diethyl carbonate  
RL: DEV (Device component use); USES (Uses)  
(charging method of nonaq. electrolyte secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)



IT 756879-33-1P  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(charging method of nonaq. electrolyte secondary battery)

RN 756879-33-1 HCAPLUS

CN Aluminum cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2
Al	x	7429-90-5

IT 872-36-6, Vinylene carbonate  
RL: MOA (Modifier or additive use); USES (Uses)  
(charging method of nonaq. electrolyte secondary battery)

## 10/563,124-324074-EIC SEARCH

RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



INCL 429231300; 429050000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 49  
 ST noneq electrolyte secondary  
 battery charging method  
 IT Coprecipitation  
 Secondary batteries  
 (charging method of noneq. electrolyte  
 secondary battery)  
 IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (charging method of noneq. electrolyte  
 secondary battery)  
 IT 96-49-1, Ethylene carbonate 105-56-8, Diethyl  
 carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (charging method of noneq. electrolyte  
 secondary battery)  
 IT 756879-33-1P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (charging method of noneq. electrolyte  
 secondary battery)  
 IT 872-36-6, Vinylene carbonate  
 7429-90-5, Aluminum, uses 7439-95-4, Magnesium, uses  
 7440-67-7, Zirconium, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (charging method of noneq. electrolyte  
 secondary battery)

L75 ANSWER 9 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
 ACCESSION NUMBER: 2006:517317 HCAPLUS Full-text  
 DOCUMENT NUMBER: 145:11312  
 TITLE: Method of charging noneaqueous  
 electrolyte secondary  
 battery  
 INVENTOR(S): Nishida, Nobumichi; Inoue, Hidetoshi  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 7 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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US 20060115733	A1	20060601	US 2005-288355	2005 1129
			<--	
US 7438991	B2	20081021		
JP 2006156230	A	20060615	JP 2004-347187	2004 1130



## 10/563,124-324074-EIC SEARCH

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KR 2006060559      A      20060605      KR 2005-100878      2005
                                                    1025
                                                    <--
CN 1783548          A      20060607      CN 2005-10127178      2005
                                                    1130
                                                    <--
CN 100553015        C      20091021
PRIORITY APPLN. INFO.:      JP 2004-347187      A      2004
                                                    1130
                                                    <--

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## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered CTN: 02 Jun 2006

AB The invention provides a non-aqueous electrolyte secondary cell that has high capacity and excels in cycle characteristics. The non-aqueous electrolyte secondary cell functions stably at a high potential of from 4.4 to 4.6 V with respect to lithium and inhibits the decomposition of the electrolytic solution at high potential. This is accomplished as follows. The non-aqueous electrolyte secondary cell has a pos. electrode having a pos. electrode active material; a neg. electrode having a neg. electrode active material; and a non-aqueous electrolyte having a non-aqueous solvent and electrolytic salt. The pos. electrode active material has: lithium cobalt compound oxide having added therein at least zirconium and magnesium; and lithium-nickel-manganese compound oxide having a layered structure. The pos. electrode active material has a potential of from 4.4 to 4.6 V with respect to lithium. The non-aqueous solvent contains di-Et carbonate of 10 volume% or higher at 25°.

IT 105-58-8, Diethyl carbonate  
642999-33-5, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); USES (Uses)  
(method of charging nonaq. electrolyte secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 642999-33-5 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IT 872-36-6, Vinylene carbonate  
RL: MOA (Modifier or additive use); USES (Uses)  
(method of charging nonaq. electrolyte secondary battery)

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



INCL 429231100; 429231300; 429326000; 429332000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte secondary  
 battery charging method  
 IT Battery anodes  
   Battery cathodes  
   Secondary batteries  
     (method of charging nonaq. electrolyte  
       secondary battery)  
 IT Carbonaceous materials (technological products)  
   RL: DEV (Device component use); USES (Uses)  
     (method of charging nonaq. electrolyte  
       secondary battery)  
 IT 887748-06-3, Cobalt manganese nickel hydroxide  
   (Co<sub>0.34</sub>Mn<sub>0.33</sub>Ni<sub>0.33</sub>(OH)<sub>2</sub>)  
   RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
     process); PROC (Process)  
     (method of charging nonaq. electrolyte  
       secondary battery)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
   carbonate 623-53-0, Ethyl methyl carbonate 7782-42-5,  
   Graphite, uses 147683-99-6, Cobalt lithium zirconium oxide  
   162684-16-4, Lithium manganese nickel oxide 642999-33-5  
   , Cobalt lithium magnesium zirconium oxide  
   RL: DEV (Device component use); USES (Uses)  
     (method of charging nonaq. electrolyte  
       secondary battery)  
 IT 872-36-6, Vinylene carbonate  
   RL: MOA (Modifier or additive use); USES (Uses)  
     (method of charging nonaq. electrolyte  
       secondary battery)

L75 ANSWER 10 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2006:470248 HCAPLUS Full-text

DOCUMENT NUMBER: 144:471465

TITLE: Nonaqueous electrolyte  
 secondary battery

INVENTOR(S): Tode, Shingo; Fujimoto, Hiroyuki; Takahashi,  
 Yasufumi; Kinoshita, Akira; Hasegawa,  
 Kazuhiro; Fujitani, Shin

PATENT ASSIGNEE(S): Sanyo Electric Co., Japan

SOURCE: U.S. Pat. Appl. Publ., 11 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
US 20060105241	A1	20060518	US 2005-168380	2005 0629
			<--	
US 7435510	B2	20081014		
JP 2006164934	A	20060622	JP 2005-60288	2005 0304
			<--	

## 10/563,124-324074-EIC SEARCH

KR 2006048698 A 20060518 KR 2005-57003 2005  
 0629  
 <--  
 CN 1773765 A 20060517 CN 2005-10080727 2005  
 0630  
 <--  
 CN 100505406 C 20090624  
 PRIORITY APPLN. INFO.: JP 2004-329406 A 2004  
 1112  
 <--  
 JP 2005-60288 A 2005  
 0304  
 <--

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STIN: 19 May 2006  
 AB A nonaq. electrolyte secondary battery comprises a pos. electrode containing a pos. active material, a neg. electrode containing a neg. active material and a nonaq. electrolyte, wherein a lithium transition metal complex oxide A formed by allowing LiCoO<sub>2</sub> to contain at least both of Zr and Mg and a lithium transition metal complex oxide B having a layered structure and containing at least both of Mn and Ni as transition metals and containing Mo are mixed and used as the pos. active material.  
 IT 105-58-8, Diethyl carbonate  
 756879-33-1 886752-61-0 886752-62-1  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte secondary battery)  
 RN 105-58-8 HCAPLUS  
 CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 756879-33-1 HCAPLUS  
 CN Aluminum cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2
Al	x	7429-90-5

RN 886752-61-0 HCAPLUS  
 CN Cobalt lithium magnesium titanium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4
Li	x	7439-93-2

## 10/563,124-324074-EIC SEARCH

RN 886752-62-1 HCAPLUS  
 CN Cobalt lithium magnesium tin zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Sn	x	7440-31-5
Mg	x	7439-95-4
Li	x	7439-93-2

IT 872-36-6, Vinylene carbonate  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte secondary  
 battery)

RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



INCL 429231300; 429231600; 429223000; 429224000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST nonaq electrolyte secondary  
 battery  
 IT Transition metal oxides  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (lithiated; nonaq. electrolyte  
 secondary battery)  
 IT Secondary batteries  
 (lithium; nonaq. electrolyte  
 secondary battery)  
 IT Battery cathodes  
 (nonaq. electrolyte secondary  
 battery)  
 IT 477700-15-5P, Cobalt lithium oxide (Co<sub>0.99</sub>LiO<sub>2</sub>)  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (Mg- and Zr-doped; nonaq. electrolyte  
 secondary battery)  
 IT 372492-00-7P, Aluminum cobalt lithium magnesium oxide  
 (Al<sub>0.01</sub>Co<sub>0.98</sub>LiMg<sub>0.01</sub>O<sub>2</sub>)  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (Zr-doped; nonaq. electrolyte  
 secondary battery)  
 IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 623-53-0, Ethyl methyl carbonate  
 756879-33-1 864452-44-8 886752-61-0  
 886752-62-1  
 RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte secondary  
 battery)  
 IT 886752-63-2P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (nonaq. electrolyte secondary  
 battery)  
 IT 872-36-6, Vinylene carbonate

## 10/563,124-324074-EIC SEARCH

7439-95-4, Magnesium, uses 7440-67-7, Zirconium, uses  
 532934-38-6, Cobalt lithium manganese nickel oxide  
 (CoO.34LiMn0.33Ni0.33O2)  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (nonaq. electrolyte secondary  
 battery)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
 THIS RECORD (2 CITINGS)  
 REFERENCE COUNT: 30 THERE ARE 30 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 11 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 2005:1262422 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:480471  
 TITLE: Nonaqueous electrolyte  
secondary battery  
 INVENTOR(S): Kitao, Hideki; Fujihara, Toyoki; Takeda,  
 Kazuhisa; Nakanishi, Naoya; Nohma, Toshiyuki  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 6 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20050266313	A1	20051201	US 2005-138268	2005 0527
US 7452631	B2	20081118	<--	
JP 2005340055	A	20051208	JP 2004-158780	2004 0528
CN 1702905	A	20051130	CN 2005-10074304	2005 0525
CN 100502133	C	20090617	<--	
KR 2006048132	A	20060518	KR 2005-44816	2005 0527
PRIORITY APPLN. INFO.:			JP 2004-158780	A 2004 0528

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 02 Dec 2005

AB In a non-aqueous electrolyte  
 secondary battery using a layered lithium-transition metal composite oxide as a pos.  
 electrode active material,  
 elevated-temperature durability, i.e., elevated-temperature storage performance is  
 enhanced without degrading battery capacity. The non-aqueous electrolyte secondary  
 battery includes: a pos. electrode including, as a pos. electrode active material,  
 layered lithium-transition metal composite oxide containing lithium, nickel, and  
 manganese; a neg. electrode active material capable of intercalating and  
 deintercalating lithium; and a non-aqueous electrolyte having lithium ion conductivity,  
 and the lithium-transition metal composite oxide contains a group IVA element and a  
 group IIA element of the periodic table.

IT 105-58-8, Diethyl carbonate

RL: DEV (Device component use); USES (Uses)

## 10/563,124-324074-EIC SEARCH

(nonaq. electrolyte secondary  
battery)  
RN 105-58-8 HCAPLUS  
CN Carbonic acid, diethyl ester (CA INDEX NAME)



IT 869792-63-2F  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(nonaq. electrolyte secondary  
battery)  
RN 869792-63-2 HCAPLUS  
CN Cobalt lithium magnesium manganese nickel zirconium oxide (CA  
INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Ni	x	7440-02-0
Mn	x	7439-96-5
Mg	x	7439-95-4
Li	x	7439-93-2

IC ICM H01M004-52  
ICS H01M004-50  
INCL 429231100; 429223000; 429224000; 429231500; 429231600; 429231300  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 49  
ST nonaq electrolyte secondary  
battery  
IT Secondary batteries  
(lithium; nonaq. electrolyte  
secondary battery)  
IT Battery cathodes  
(nonaq. electrolyte secondary  
battery)  
IT 217309-43-8P, Cobalt lithium manganese nickel oxide  
(Co<sub>0.3</sub>LiMn<sub>0.3</sub>Ni<sub>0.4</sub>O<sub>2</sub>)  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(Mn- and Zr-doped; nonaq. electrolyte  
secondary battery)  
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
carbonate 7782-42-5, Graphite, uses 21324-40-3,  
Lithium hexafluorophosphate 362666-83-9, Aluminum lithium  
manganese oxide (Al<sub>0.1</sub>Li<sub>1.1</sub>Mn<sub>1.8</sub>O<sub>4</sub>)  
RL: DEV (Device component use); USES (Uses)  
(nonaq. electrolyte secondary  
battery)  
IT 869792-63-2P  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)  
(nonaq. electrolyte secondary  
battery)  
IT 7439-96-5, Manganese, uses 7440-67-7, Zirconium, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(nonaq. electrolyte secondary

## 10/563,124-324074-EIC SEARCH

battery)  
 REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 12 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 2005:1102902 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:329274  
 TITLE: Secondary nonaqueous  
 electrolyte battery  
 INVENTOR(S): Abe, Hiroshi; Miyoshi, Kazuhiro; Takahashi,  
 Yasufumi; Fujimoto, Hiroyuki; Kinoshita,  
 Akira; Toide, Shingo; Nakane, Ikuro; Fujitani,  
 Shin  
 PATENT ASSIGNEE(S): Ube Industries, Ltd., Japan; Sanyo Electric  
 Co., Ltd.  
 SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005285630	A	20051013	JP 2004-99430	2004 0330
JP 4291195	B2	20090708	<--	
CA 2525923	A1	20050930	CA 2005-2525923	2005 0218
WO 2005099021	A1	20051020	WO 2005-JP2576	2005 0218
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MY, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CN 1806361	A	20060719	CN 2005-80000453	2005 0218
CN 100544108	C	20090923	<--	
EP 1739783	A1	20070103	EP 2005-710409	2005 0218
R: DE, FR, GB			<--	
US 20060166096	A1	20060727	US 2006-563124	2006 0103
KR 2007004796	A	20070109	KR 2006-720316	2006

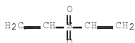
## 10/563,124-324074-EIC SEARCH

0929

PRIORITY APPLN. INFO.: <-- JP 2004-99430 A 2004 0330  
 <-- WO 2005-JP2576 W 2005 0218  
 <--

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STIN: 14 Oct 2005  
 AB The battery has a graphite anode, a LiCoO2 based cathode, and a nonaq. electrolyte solution; where the LiCoO2 contains Group IIA and Group IVA elements, and the electrolyte solution contains 0.2-1.5% of a compound having sulfonyl group.  
 IT 77-77-0, Divinyl sulfone  
 105-58-8, Diethyl carbonate  
 872-36-6, Vinylene carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte solns. containing sulfonyl compound for secondary lithium batteries)  
 RN 77-77-0 HCAPLUS  
 CN Ethene, 1,1'-sulfonylbis- (CA INDEX NAME)



RN 105-58-8 HCAPLUS  
 CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 872-36-6 HCAPLUS  
 CN 1,3-Dioxol-2-one (CA INDEX NAME)



IT 642999-33-5, Cobalt lithium magnesium zirconium oxide  
 RL: DEV (Device component use); USES (Uses)  
 (magnesium and zirconium containing lithium cobaltate cathodes for secondary lithium batteries)  
 RN 642999-33-5 HCAPLUS  
 CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component
		Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4



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Mg		x		7439-95-4
Li		x		7439-93-2

IC ICM H01M010-40  
ICS H01M004-02; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery cathode lithium cobalt zinc  
magnesium oxide; sulfonyl compd electrolyte soln  
secondary lithium battery

IT Battery electrolytes  
(electrolyte solns. containing sulfonyl compound for  
secondary lithium batteries)

IT Secondary batteries  
(lithium; secondary lithium  
batteries with magnesium and zirconium containing lithium  
cobaltate cathodes and sulfonyl compound containing  
electrolyte solns.)

IT Battery cathodes  
(magnesium and zirconium containing lithium cobaltate  
cathodes for secondary lithium  
batteries)

IT 77-77-0, Divinyl sulfone 96-49-1,  
Ethylene carbonate 105-58-8, Diethyl  
carbonate 872-36-6, Vinylene  
carbonate 21324-40-3, Lithium hexafluorophosphate  
433304-54-2  
RL: DEV (Device component use); USES (Uses)  
(electrolyte solns. containing sulfonyl compound for  
secondary lithium batteries)

IT 642999-33-5, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); USES (Uses)  
(magnesium and zirconium containing lithium cobaltate  
cathodes for secondary lithium  
batteries)

L75 ANSWER 13 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
ACCESSION NUMBER: 2005:985067 HCAPLUS Full-text  
DOCUMENT NUMBER: 143:251104  
TITLE: Secondary nonaqueous-

electrolyte battery with  
excellent cycling performance  
INVENTOR(S): Chiga, Takanobu; Yanagida, Katsunori; Yanai,  
Atsushi; Kita, Yoshinori  
PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 12 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	---	-----	-----	
JP 2005243301	A	20050908	JP 2004-48591	2004 0224
US 20050196674	A1	20050908	US 2005-64112	2005 0223
US 7335446	B2	20080226		
PRIORITY APPLN. INFO.:			JP 2004-48591	A 2004 0224

## 10/563,124-324074-EIC SEARCH

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LUSIS DISPLAY FORMAT

ED Entered STM: 09 Sep 2005

AB In the battery, the cathode active mass is a transition metal oxide with layered structure containing Li, Co, Group IVB element, and Group IIB element, and at least part of the oxide is covered with a phosphate compound represented by  $M_1PO_4$  ( $M_1 = 3$ -valent element;  $k = 2-4$ ). The battery has excellent cycle performance without lowering of initial charge/discharge efficiency.

IT 253868-42-7, Cobalt lithium magnesium titanium oxide

678158-98-0, Cobalt hafnium lithium magnesium oxide

RL: DEV (Device component use); USES (Uses)

(nonaq.-electrolyte battery using

phosphate-coated layered oxide containing Li, Co, Group IVB element, and Group IIB element as cathode active mass)

RN 253868-42-7 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4
Li	x	7439-93-2

RN 678158-98-0 HCAPLUS

CN Cobalt hafnium lithium magnesium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Hf	x	7440-58-6
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide

RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)

(nonaq.-electrolyte battery using

phosphate-coated layered oxide containing Li, Co, Group IVB element, and Group IIB element as cathode active mass)

RN 642999-33-5 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

IC ICM H01M004-58

ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST layered lithium cobalt oxide Group IVB IIB element cathode

; lithium cobalt oxide phosphate coating battery

cathode; nonaq electrolyte

battery cathode active mass cycling performance

IT Battery cathodes

(nonaq.-electrolyte battery using

phosphate-coated layered oxide containing Li, Co, Group IVB

## 10/563,124-324074-EIC SEARCH

element, and Group IIB element as cathode active mass)

IT 13765-96-3, Cerium phosphate 13778-59-1, Lanthanum phosphate  
13990-54-0, Yttrium phosphate 253868-42-7, Cobalt  
lithium magnesium titanium oxide 678158-98-0, Cobalt  
hafnium lithium magnesium oxide

RL: DEV (Device component use); USES (Uses)

(nonaq.-electrolyte battery using

phosphate-coated layered oxide containing Li, Co, Group IVB  
element, and Group IIB element as cathode active

mass)

IT 7784-30-7P, Aluminum phosphate 642999-33-5P, Cobalt  
lithium magnesium zirconium oxide

RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)

(nonaq.-electrolyte battery using

phosphate-coated layered oxide containing Li, Co, Group IVB  
element, and Group IIB element as cathode active

mass)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
THIS RECORD (2 CITINGS)

L75 ANSWER 14 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2005:726431 HCAPLUS Full-text

DOCUMENT NUMBER: 143:176285

TITLE: Nonaqueous electrolyte  
secondary lithium  
batteries with excellent charge  
storage

INVENTOR(S): Yanai, Atsushi; Yanagida, Katsunori; Kita,  
Yoshinori; Noma, Toshiyuki

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokyo Koho, 16 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2005216795	A	20050811	JP 2004-25189	2004 0202

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PRIORITY APPLN. INFO.: JP 2004-25189

2004  
0202

<--

ED Entered STN: 11 Aug 2005

AB The batteries comprise a Li-intercalating anode with active materials having BET  
surface area of  $\geq 5.0$  m<sup>2</sup>/g, a Li-containing transition metal oxide cathode, and nonaq.  
electrolytes with their solvents containing  $\geq 50$  volume%  $\gamma$ -butyrolactone and are  
characterized by the value of the depth of discharge (DOD) showing min. dV/d(DOD) (V =  
battery voltage on 5-h rate discharging; DOD = 10-80%; dV/d(DOD)  $< -0.015$ ) (R) being 10-  
16.8% of DOD. Preferably, the cathode active material is Li-containing Co oxides or  
contain  $\geq 1$  element(s) selected from Groups 2, 4, 7, 8, 9, 10, 12, 13, and 14 elements.  
Cathode side reaction is prevented under the given DOD conditions.

IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide

RL: DEV (Device component use); IMF (Industrial manufacture); PREP  
(Preparation); USES (Uses)

(cathode active material;

nonaq.  $\gamma$ -butyrolactone electrolyte

secondary lithium batteries with

excellent charge storage)

## 10/563,124-324074-EIC SEARCH

RN 642999-33-5 HCAPLUS  
 CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
-----	-----	-----
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2
IC	ICM H01M010-40 ICS H01M004-02; H01M004-58	
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)	
ST	nonaq electrolyte secondary lithium battery charge storage high; butyrolactone nonaq electrolyte solvent secondary lithium battery; cobalt lithium oxide cathode secondary lithium battery	
IT	Transition metal oxides RL: DEV (Device component use); USES (Uses) (cathode active materials containing; nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	Secondary batteries (lithium; nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	Battery cathodes (nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	Group VIIB element compounds RL: DEV (Device component use); USES (Uses) (oxides, transition metal oxide cathode active materials containing; nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	Alkaline earth oxides Group IIB element oxides Group IIIA element oxides Group IVA element oxides Group IVB element oxides Group VIII element oxides RL: DEV (Device component use); USES (Uses) (transition metal oxide cathode active materials containing; nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	52627-24-4P, Cobalt lithium oxide 149087-95-6P, Cobalt lithium tin oxide 642999-33-5P, Cobalt lithium magnesium zirconium oxide RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses) (cathode active material; nonaq. $\gamma$ -butyrolactone electrolyte secondary lithium batteries with excellent charge storage)	
IT	14283-07-9, Lithium tetrafluoroborate RL: DEV (Device component use); USES (Uses) (electrolyte; nonaq. $\gamma$ -butyrolactone	

## 10/563,124-324074-EIC SEARCH

electrolyte secondary lithium  
batteries with excellent charge storage)

IT 96-49-1, Ethylene carbonate  
RL: DEV (Device component use); USES (Uses)  
(solvent with  $\gamma$ -butyrolactone; nonaq.  
 $\gamma$ -butyrolactone electrolyte secondary  
lithium batteries with excellent charge  
storage)

IT 96-48-0,  $\gamma$ -Butyrolactone  
RL: DEV (Device component use); USES (Uses)  
(solvent; nonaq.  $\gamma$ -butyrolactone  
electrolyte secondary lithium  
batteries with excellent charge storage)

L75 ANSWER 15 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
ACCESSION NUMBER: 2005:497042 HCAPLUS Full-text  
DOCUMENT NUMBER: 143:29515  
TITLE: Secondary nonaqueous  
electrolyte battery

INVENTOR(S): Nishimura, Makiko; Takeuchi, Takashi;  
Nagasaki, Akira; Takagi, Suguru

PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 20 pp.  
CODEN: JKXXAF

DOCUMENT TYPE: Patent  
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2005149959	A	20050609	JP 2003-387180	2003 1117

PRIORITY APPLN. INFO.: <--  
JP 2003-387180  
2003  
1117

ED Entered STN: 10 Jun 2005

AB The battery has a cathode active mass-containing cathode; an anode active mass-containing anode, and a nonaq. electrolyte solution; where the cathode active mass comprises Li Co composite oxide particles and the electrolyte solution contains LiPF<sub>6</sub> and LiBF<sub>4</sub> as electrolyte salt; where the oxide furthermore contains  $\geq 1$  M1 element selected from Mg, Cu and Zn and  $\geq 1$  M2 element selected from Al, Ca, Ba, Sr, Y and Zr; The M1 element is evenly distributed in the oxide particles, and the M2 element is distributed more in the surface than inside of the oxide particles.

IT 642999-33-5, Cobalt lithium magnesium zirconium oxide  
RL: DEV (Device component use); USES (Uses)  
(cathodes containing lithium cobalt composite oxides and  
electrolytes containing LiPF<sub>6</sub> and LiBF<sub>4</sub> for  
secondary lithium batteries)

RN 642999-33-5 HCAPLUS  
CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

## 10/563,124-324074-EIC SEARCH

IC ICM H01M010-40  
 ICS H01M004-02; H01M004-58; C01G051-00  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary battery cathode  
 lithium cobalt composite oxide; battery  
 electrolyte lithium hexafluorophosphate  
 lithium tetrafluoroborate  
 IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium  
 hexafluorophosphate 642999-33-5, Cobalt lithium  
 magnesium zirconium oxide 642999-49-3, Aluminum cobalt lithium  
 magnesium oxide 721430-98-4, Cobalt lithium magnesium strontium  
 oxide 721430-99-5, Calcium cobalt lithium magnesium oxide  
 852995-92-7, Barium cobalt lithium magnesium oxide 852995-93-8,  
 Cobalt lithium magnesium yttrium oxide 852995-94-9, Aluminum  
 cobalt copper lithium oxide 852995-95-0, Aluminum cobalt lithium  
 zinc oxide  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes containing lithium cobalt composite oxides and  
 electrolytes containing LiPF<sub>6</sub> and LiBF<sub>4</sub> for  
 secondary lithium batteries)

L75 ANSWER 16 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 2005:451706 HCAPLUS Full-text  
 DOCUMENT NUMBER: 143:10533  
 TITLE: Secondary nonaqueous  
 electrolyte battery  
 INVENTOR(S): Takeuchi, Takashi; Nagasaki, Akira; Yoshizawa,  
 Hiroshi  
 PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
 Japan  
 SOURCE: PCT Int. Appl., 57 pp.  
 CODEN: PIXXD2  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
WO 2005048380	A1	20050526	WO 2004-JP16653	2004 1110
<--				
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MM, MX, MY, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CN 1875505	A	20061206	CN 2004-80032047	2004 1110
<--				
CN 100495774	C	20090603		
US 20080248392	A1	20081009	US 2006-572590	2006 0320
<--				
KR 2006066125	A	20060615	KR 2006-707766	

2006  
0421

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

AB The battery has a separator between a cathode and an anode and an electrolyte solution; where the cathode contains a cathode active mass, comprising a Li composite oxide:  $\text{Li}x\text{Me}_1-y-z\text{MyLzO}_2$  [Me = transition metal element(s) excluding Ti, Mn, Y, and Zr; M = Mg, Ti, Nb, and/or Zn; L = Al, Ca, Ba, Sr, Y, and/or Zr;  $x = 1-1.05$ ;  $y = 0.005-0.1$  (but  $y = 0.005-0.5$  when M is Mn); and  $z = 0-0.05$ ]; and the separator consists of a stack of single-layer films, having a fine porous structure; where the single-layer film facing the cathode is made of polypropylene.

RL: DEV (Device component use); USES (Uses)  
(cathodes containing lithium composite oxides and  
separators containing polypropylene for secondary  
lithium batteries)

CN Cobalt lithium magnesium zirconium oxide (Co0.94LiMg0.05Zr0.01O2)  
(CA INDEX NAME)

IC ICM H01M004-48

ICS H01M004-58: H01M004-02: H01M010-40: H01M002-16

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary battery cathode  
lithium composite oxide; battery separator  
single layer film stack polyethylene

IT Battery cathodes

Secondary battery separators  
(cathodes containing lithium composite oxides  
and separators containing polypropylene for secondary  
lithium batteries)

IT Secondary batteries

(lithium; cathodes containing lithium composite oxides and separators containing polypropylene for secondary lithium batteries)

IT	7782-42-5, Graphite, uses 9002-88-4, Polyethylene	9003-07-0, Polypropylene	144419-56-7, Cobalt lithium magnesium oxide
	(Co0.95LiMg0.0502)	34564-85-3, Aluminum cobalt lithium oxide	
	(Al0.10Co0.99Li02)	372491-01-1, Aluminum cobalt lithium magnesium oxide	(Al0.1Co0.89LiMg0.0102)
		372491-82-2, Aluminum cobalt lithium magnesium oxide	(Al0.01Co0.96LiMg0.0302)
		372491-83-3, Aluminum cobalt lithium magnesium oxide	(Al0.01Co0.94LiMg0.0502)
		372492-00-7, Aluminum cobalt lithium magnesium oxide	(Al0.01Co0.98LiMg0.0102)
		478814-69-6, Aluminum cobalt lithium magnesium oxide	(Al0.05Co0.9LiMg0.0502)
		489431-33-6, Aluminum cobalt lithium oxide	(Al0.01Co0.98Li02)
		721448-53-9, Cobalt lithium magnesium oxide	(Co0.94LiMg0.0502)

## 10/563,124-324074-EIC SEARCH

852333-25-6, Aluminum cobalt lithium magnesium oxide  
 (Al<sub>0.1</sub>Co<sub>0.85</sub>LiMg<sub>0.05</sub>O<sub>2</sub>) 852333-26-7, Aluminum cobalt lithium  
 magnesium oxide (Al<sub>0.2</sub>Co<sub>0.79</sub>LiMg<sub>0.01</sub>O<sub>2</sub>) 852333-27-8, Cobalt  
 lithium magnesium strontium oxide (Co<sub>0.94</sub>LiMg<sub>0.05</sub>Sr<sub>0.01</sub>O<sub>2</sub>)  
 852333-28-9, Cobalt lithium magnesium zirconium oxide  
 (Co<sub>0.94</sub>LiMg<sub>0.05</sub>Zr<sub>0.01</sub>O<sub>2</sub>) 852333-29-0, Calcium cobalt lithium  
 magnesium oxide (Ca<sub>0.01</sub>Co<sub>0.94</sub>LiMg<sub>0.05</sub>O<sub>2</sub>) 852333-31-4, Barium  
 cobalt lithium magnesium oxide (Ba<sub>0.01</sub>Co<sub>0.94</sub>LiMg<sub>0.05</sub>O<sub>2</sub>)  
 852333-33-6, Cobalt lithium magnesium yttrium oxide  
 (Co<sub>0.94</sub>LiMg<sub>0.05</sub>Y<sub>0.01</sub>O<sub>2</sub>) 852333-35-8, Aluminum cobalt lithium  
 titanium oxide (Al<sub>0.01</sub>Co<sub>0.94</sub>LiTi<sub>0.05</sub>O<sub>2</sub>) 852333-37-0, Aluminum  
 cobalt lithium zinc oxide (Al<sub>0.01</sub>Co<sub>0.94</sub>LiZn<sub>0.05</sub>O<sub>2</sub>) 852333-38-1,  
 Aluminum cobalt lithium manganese oxide (Al<sub>0.01</sub>Co<sub>0.94</sub>LiMn<sub>0.05</sub>O<sub>2</sub>)  
 852333-39-2, Aluminum cobalt lithium magnesium oxide  
 (Al<sub>0.03</sub>Co<sub>0.92</sub>LiMg<sub>0.05</sub>O<sub>2</sub>) 852333-41-6, Aluminum cobalt lithium  
 magnesium oxide (Al<sub>0.01</sub>Co<sub>0.91</sub>LiMg<sub>0.08</sub>O<sub>2</sub>) 852333-42-7, Aluminum  
 cobalt lithium magnesium oxide (Al<sub>0.01</sub>Co<sub>0.84</sub>LiMg<sub>0.15</sub>O<sub>2</sub>)  
 852333-43-8, Aluminum cobalt lithium magnesium oxide  
 (Al<sub>0.05</sub>Co<sub>0.89</sub>LiMg<sub>0.06</sub>O<sub>2</sub>)

RL: DEV (Device component use); USES (Uses)  
 (cathodes containing lithium composite oxides and  
 separators containing polypropylene for secondary  
 lithium batteries)

REFERENCE COUNT: 26 THERE ARE 26 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 17 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2004:796473 HCAPLUS Full-text

DOCUMENT NUMBER: 141:263471

TITLE: Cathode active  
 material for nonaqueous  
 electrolyte secondary  
 battery

INVENTOR(S): Takahashi, Takeshi; Oba, Takeshi; Fujino,  
 Kenji; Tokuno, Junichi; Morizaki, Masuhiro;  
 Kondo, Takeyuki; Seyama, Jun

PATENT ASSIGNEE(S): Nichia Corporation, Japan

SOURCE: Eur. Pat. Appl., 54 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1463132	A2	20040929	EP 2004-7076	2004 0324
<--				
EP 1463132	A3	20090401		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK				
JP 2005050712	A	20050224	JP 2003-282341	2003 0730
<--				
JP 2005123111	A	20050512	JP 2003-358885	2003 1020
<--				
JP 2005190900	A	20050714	JP 2003-432856	2003 1226



## 10/563,124-324074-EIC SEARCH

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JP 2004311408      A      20041104      JP 2004-42699      2004
                                           0219
                                           <---
TW 286849          B      20070911      TW 2004-93105565      2004
                                           0303
                                           <---
KR 2004084643      A      20041006      KR 2004-17292      2004
                                           0315
                                           <---
US 20040229123     A1     20041118      US 2004-806206      2004
                                           0323
                                           <---
CN 1532966         A      20040929      CN 2004-10007990      2004
                                           0325
                                           <---
CN 100355125       C      20071212
PRIORITY APPLN. INFO.:      JP 2003-83806      A      2003
                                           0325
                                           <---
                                           JP 2003-282341      A      2003
                                           0730
                                           <---
                                           JP 2003-358885      A      2003
                                           1020
                                           <---
                                           JP 2003-432856      A      2003
                                           1226
                                           <---
ED Entered STN: 30 Sep 2004
AB Disclosed is a pos. electrode active material for a nonaq. electrolyte secondary
battery having at least a lithium-transition metal composite oxide of a layer
structure, in which an existence ratio of at least one selected from the group
consisting of elements which may become tetravalent and magnesium is 20% or more on a
surface of the lithium-transition metal composite oxide. By use of this pos. electrode
active material, a
nonaq. electrolyte secondary
battery having excellent battery characteristics, specifically, having excellent high
rate characteristics, cycle characteristics, low-temperature characteristics, thermal
stability, and the like, under the even more harsh environment for use can be realized.
IT 642999-33-5P, Cobalt lithium magnesium zirconium oxide
756879-33-1P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP
(Preparation); USES (Uses)
(cathode active material for
nonaq. electrolyte secondary
battery)
RN 642999-33-5 HCAPLUS
CN Cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

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Component	Ratio	Component
		Registry Number
O	x	1778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

## 10/563,124-324074-EIC SEARCH

RN 756879-33-1 HCAPLUS  
 CN Aluminum cobalt lithium magnesium zirconium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	1778-80-2
Zr	x	7440-67-7
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2
Al	x	7429-90-5

IC ICM H01M004-48  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST cathode active material  
 nonaq electrolyte secondary  
 battery  
 IT Battery cathodes  
 Electric vehicles  
 Secondary batteries  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)  
 IT Carbonaceous materials (technological products)  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)  
 IT Telephones  
 (cellular phones; cathode active  
 material for nonaq. electrolyte  
 secondary battery)  
 IT Transition metal oxides  
 RL: DEV (Device component use); USES (Uses)  
 (lithiated; cathode active material  
 for nonaq. electrolyte secondary  
 battery)  
 IT Secondary batteries  
 (lithium; cathode active  
 material for nonaq. electrolyte  
 secondary battery)  
 IT Computers  
 (personal; cathode active material  
 for nonaq. electrolyte secondary  
 battery)  
 IT Lithium alloy, base  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)  
 IT 7439-93-2, Lithium, uses 131344-56-4, Cobalt lithium nickel  
 oxide 177997-13-6, Aluminum cobalt lithium nickel oxide  
 182442-95-1, Cobalt lithium manganese nickel oxide  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)  
 IT 116713-67-8P, Cobalt lithium titanium oxide 147683-99-6P, Cobalt  
 lithium zirconium oxide 187144-48-5P, Cobalt lithium magnesium  
 oxide 191025-46-4P, Cobalt lithium nickel zirconium oxide  
 642999-33-5P, Cobalt lithium magnesium zirconium oxide  
 756879-33-1P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (cathode active material for

## 10/563,124-324074-EIC SEARCH

nonaq. electrolyte secondary  
battery)

OS.CITING REF COUNT: 6 THERE ARE 6 CAPLUS RECORDS THAT CITE  
THIS RECORD (16 CITINGS)

L75 ANSWER 18 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2004:680809 HCAPLUS Full-text

DOCUMENT NUMBER: 141:210081

TITLE: Cathode active  
material and nonaqueous  
electrolyte secondary  
battery

INVENTOR(S): Matsushita, Takuro; Sakamoto, Takako; Eto,  
Hiroyasu

PATENT ASSIGNEE(S): Nichia Chemical Industries Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokyo Koho, 22 pp.

DOCUMENT TYPE: CODEN: JKXXAF

LANGUAGE: Patent

FAMILY ACC. NUM. COUNT: 1 Japanese

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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JP 2004235144	A	20040819	JP 2003-429625	2003 1225

			<--	
PRIORITY APPLN. INFO.:		JP 2003-5009	A	2003 0110
			<--	

ED Entered STN: 20 Aug 2004

AB The disclosed cathode active substances are spinel structure Li-transition metal oxides containing alkali or alkaline earth metal. The secondary battery containing the cathode active substances has improved power output and cyclic charge-discharge characteristics. The cathode active material for the nonaq. electrolyte secondary battery which is stated in this invention the alkaline metal and/or is the cathode active material for the nonaq. electrolyte secondary battery which possesses the lithium transition metal compound oxide which consists of the spinel structure which includes the alkaline earths metal. The alkaline metal and/or by the fact that the alkaline earths metal is added, decrease of the diffused resistor of the lithium ion becomes possible, it is thought that output characteristics improve. In addition, in order for crystalline structure of the lithium transition metal compound oxide which consists of spinel structure and furthermore to be stabilized, it is thought that the cycle charge-discharge behavior furthermore improve. It is not.

IT 253868-42-7P, Cobalt lithium magnesium titanium oxide  
678158-98-0P, Cobalt hafnium lithium magnesium oxide  
678158-99-1P, Cobalt lithium magnesium zirconium oxide  
(Co<sub>0.98</sub>LiMg<sub>0.01</sub>Zr<sub>0.01</sub>O<sub>2</sub>)  
RL: SPN (Synthetic preparation); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(lithium secondary battery  
cathode active substance)

RN 253868-42-7 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
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O	x	17778-80-2
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4

## 10/563,124-324074-EIC SEARCH

Li | x | 7439-93-2

RN 678158-98-0 HCAPLUS

CN Cobalt hafnium lithium magnesium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Hf	x	7440-58-6
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

RN 678158-99-1 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (Co0.98LiMg0.01Zr0.01O2)  
(CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.01	7440-67-7
Co	0.98	7440-48-4
Mg	0.01	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-58

ICS H01M004-02; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq lithium battery

cathode active lithium transition metal oxide

IT Battery cathodes

(alkali or alkaline earth metal-containing lithium transition metal  
composite oxides as cathode active  
substance for)

IT 198213-69-3P, Cobalt lithium magnesium oxide (Co0.99LiMg0.01O2)

253868-42-7P, Cobalt lithium magnesium titanium oxide

329082-61-3P, Cobalt lithium zirconium oxide (Co0.99LiZr0.01O2)

477700-15-5P, Cobalt lithium oxide (Co0.99LiO2)

678158-98-0P, Cobalt hafnium lithium magnesium oxide

678158-99-1P, Cobalt lithium magnesium zirconium oxide

(Co0.98LiMg0.01Zr0.01O2)

RL: SPN (Synthetic preparation); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)

(lithium secondary battery

cathode active substance)

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE  
THIS RECORD (3 CITINGS)

L75 ANSWER 19 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2004:678453 HCAPLUS Full-text

DOCUMENT NUMBER: 141:210058

TITLE: Nonaqueous electrolyte

secondary battery

INVENTOR(S): Takahashi, Yasufumi; Fujimoto, Hiroyuki;  
Kinoshita, Akira; Fujiwara, Toyoki; Tode,

Shingo; Nakane, Ikuro; Fujitani, Shin

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: PCT Int. Appl., 36 pp.

CODEN: PIXXD2

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO. KIND DATE APPLICATION NO. DATE

# 10/563,124-324074-EIC SEARCH

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WO 2004070863      A1      20040819      WO 2004-JP358
                                           2004
                                           0119

                                           <--
W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ,
    CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG,
    ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE,
    KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
    MK, MN, MW, MX, MZ, NA, NI, NO
RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW,
    AT, BE, BG, CH, CY, CZ, DE, DK, EE, EG, FI, FR, GB, GR,
    HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ,
    CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

JP 2005050779      A      20050224      JP 2003-392395
                                           2003
                                           1121

                                           <--
JP 4307962          B2      20090805
EP 1598884          A1      20051123      EP 2004-703249
                                           2004
                                           0119

                                           <--
R:  AT, BE, CH, DE, DK, EG, FR, GB, GR, IT, LI, LU, NL, SE,
    MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,
    EE, HU, SK
CN 1771619          A      20060510      CN 2004-80003421
                                           2004
                                           0119

                                           <--
CN 100342571        C      20071010
US 20060078795      A1      20060413      US 2005-544210
                                           2005
                                           0802

                                           <--
US 20090208846      A1      20090820      US 2009-385710
                                           2009
                                           0416

                                           <--
PRIORITY APPLN. INFO.:      JP 2003-25761      A
                                           2003
                                           0203

                                           <--
                                           JP 2003-195652      A
                                           2003
                                           0711

                                           <--
                                           JP 2003-392395      A
                                           2003
                                           1121

                                           <--
                                           WO 2004-JP358      W
                                           2004
                                           0119

                                           <--
                                           US 2005-544210      A3
                                           2005
                                           0802

                                           <--
ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT
ED   Entered STN:  19 Aug 2004
AB   A nonaq. electrolyte secondary battery comprising a pos. electrode containing a pos.
     electrode active material, a neg. electrode containing a neg. electrode active material
     , and a nonaq. electrolyte is characterized in that the pos. electrode active material
     is composed of a lithium transition metal oxide having a layer structure and containing

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# 10/563,124-324074-EIC SEARCH

Li and Co and further contains a group IVA element and group IIA element of the periodic table. The secondary battery shows greatly improved cyclic use lifetime.

IT 253868-42-7B, Cobalt lithium magnesium titanium oxide  
 678158-98-0P, Cobalt hafnium lithium magnesium oxide  
 678158-99-1P, Cobalt lithium magnesium zirconium oxide  
 (Co0.98LiMg0.01Zr0.01O2)  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (nonaq. electrolyte secondary battery anode active substance)

RN 253868-42-7 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4
Li	x	7439-93-2

RN 678158-98-0 HCAPLUS

CN Cobalt hafnium lithium magnesium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Hf	x	7440-58-6
Co	x	7440-48-4
Mg	x	7439-95-4
Li	x	7439-93-2

RN 678158-99-1 HCAPLUS

CN Cobalt lithium magnesium zirconium oxide (Co0.98LiMg0.01Zr0.01O2)  
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.01	7440-67-7
Co	0.98	7440-48-4
Mg	0.01	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-58  
 ICS H01M004-02; H01M010-40; H01M004-62

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq electrolyte battery  
 anode active lithium cobalt oxide

IT Battery anodes  
 (nonaq. lithium battery;  
 lithium cobalt oxide type anode active substances for)

IT 198213-69-3P, Cobalt lithium magnesium oxide (Co0.99LiMg0.01O2)  
 253868-42-7B, Cobalt lithium magnesium titanium oxide  
 329082-61-3P, Cobalt lithium zirconium oxide (Co0.99LiZr0.01O2)  
 477700-15-5P, Cobalt lithium oxide (Co0.99LiO2)  
 678158-98-0P, Cobalt hafnium lithium magnesium oxide  
 678158-99-1P, Cobalt lithium magnesium zirconium oxide  
 (Co0.98LiMg0.01Zr0.01O2)  
 RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (nonaq. electrolyte secondary

## 10/563,124-324074-EIC SEARCH

battery anode active  
substance)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE  
THIS RECORD (2 CITINGS)  
REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L75 ANSWER 20 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN  
ACCESSION NUMBER: 2004:609797 HCAPLUS Full-text  
DOCUMENT NUMBER: 141:108983  
TITLE: A highly safe battery pack for  
lithium ion secondary  
battery  
INVENTOR(S): Yoshizawa, Hiroshi; Saito, Koji; Shirasawa,  
Katsuyuki; Ohta, Shinji  
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
Japan  
SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20040146775	A1	20040729	US 2003-736536	2003 1217
US 7354677	B2	20080408	<--	
JP 2004228045	A	20040812	JP 2003-17918	2003 0127
PRIORITY APPLN. INFO.:			JP 2003-17918	A 2003 0127

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 30 Jul 2004

AB A battery pack comprises a lithium ion secondary battery and a current interrupting device for protecting the secondary battery, the secondary battery comprising pos. and neg. electrodes, a separator interposed between the pos. and neg. electrodes and a nonaq. electrolyte, the current interrupting device comprising a recoverable device and a non-recoverable device, the recoverable and non-recoverable devices being connected in series with each other, and the non-recoverable device having an operating temperature of not less than 90° and less than 150°.

IT 105-58-8, Diethyl carbonate  
RL: DEV (Device component use); USES (Uses)  
(highly safe battery pack for lithium ion  
secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)

EtO<sub>2</sub>C<sub>2</sub>H<sub>5</sub>

IT 253866-42-7P, Cobalt lithium magnesium titanium oxide  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP

## 10/563,124-324074-EIC SEARCH

(Preparation); USES (Uses)  
 (highly safe battery pack for lithium ion  
 secondary battery)

RN 253868-42-7 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	1778-80-2
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4
Li	x	7439-93-2

IC ICM H01M010-50  
 ICS H01M004-52; H01M010-40  
 INCL 429061000; 429062000; 429231300; 429231600; 429330000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 76  
 ST safe battery pack lithium ion  
 secondary battery  
 IT PTCR materials  
 (device; highly safe battery pack for lithium  
 ion secondary battery)  
 IT Shape memory alloys  
 RL: DEV (Device component use); USES (Uses)  
 (device; highly safe battery pack for lithium  
 ion secondary battery)  
 IT Circuit breakers  
 (highly safe battery pack for lithium ion  
 secondary battery)  
 IT Secondary batteries  
 (lithium; highly safe battery pack for  
 lithium ion secondary battery)  
 IT 719276-48-9, Cobalt lithium magnesium oxide Co0.94Li1.01Mg0.0502  
 721430-97-3, Copper lithium magnesium oxide (Cu0.94Li1.01Mg0.0502)  
 RL: DEV (Device component use); USES (Uses)  
 (Al-doped; highly safe battery pack for  
 lithium ion secondary battery)  
 IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 105-58-8, Diethyl carbonate  
 7782-42-5, Graphite, uses 14283-07-9, Lithium  
 tetrafluoroborate 21324-40-3, Lithium  
 hexafluorophosphate 187144-48-5, Cobalt lithium magnesium oxide  
 RL: DEV (Device component use); USES (Uses)  
 (highly safe battery pack for lithium ion  
 secondary battery)  
 IT 160152-00-1P, Cobalt lithium oxide CoLi1.01O2 180997-14-2P,  
 Cobalt lithium magnesium nickel oxide 253868-42-7P,  
 Cobalt lithium magnesium titanium oxide 642999-49-3P, Aluminum  
 Cobalt lithium magnesium oxide 721430-98-4P, Cobalt lithium  
 magnesium strontium oxide 721430-99-5P, Calcium cobalt lithium  
 magnesium oxide  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (highly safe battery pack for lithium ion  
 secondary battery)  
 OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
 THIS RECORD (1 CITINGS)  
 REFERENCE COUNT: 5 THERE ARE 5 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 21 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 2004:589101 HCAPLUS Full-text



## 10/563,124-324074-EIC SEARCH

DOCUMENT NUMBER: 141:108973  
 TITLE: Method of producing cathode active material for nonaqueous electrolyte secondary battery  
 INVENTOR(S): Nagayama, Masatoshi; Yoshizawa, Hiroshi  
 PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd., Japan  
 SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20040142241	A1	20040722	US 2004-750861	2004 0105
US 7157186	B2	20070102	<--	
JP 2004220785	A	20040805	JP 2003-2893	2003 0109
JP 4274801	B2	20090610	<--	
CN 1518142	A	20040804	CN 2004-10001673	2004 0109
CN 1258240	C	20060531	<--	
PRIORITY APPLN. INFO.:			JP 2003-2893	A 2003 0109

ED Entered STN: 23 Jul 2004  
 AB A method of producing a pos. electrode active material for a noneq. electrolyte secondary battery comprises the steps of: (a) preparing a raw material mixture, comprising "nx" mol of magnesium, "ny" mol of an element M where the element M is at least one selected from the group consisting of Al, Ti, Sr, Mn, Ni and Ca, "n(1-x-y)" mol of cobalt and "nz" mol of lithium, such that the values n, x, y and z satisfy  $0 < n, 0.97 \leq (1/z) \leq 1, 0.005 \leq x \leq 0.1, \text{ and } 0.001 \leq y \leq 0.03$ ; and (b) baking the raw material mixture in an oxidization atmospheric at 1000 to 1100°.  
 IT 719276-56-9P, Cobalt lithium magnesium titanium oxide (Co0.94Li1.01Mg0.05Ti0.01O2) 719276-57-6P, Cobalt lithium magnesium titanium oxide (Co0.93Li1.01Mg0.05Ti0.03O2)  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (method of producing cathode active material for noneq. electrolyte secondary battery)  
 RN 719276-56-9 HCAPLUS  
 CN Cobalt lithium magnesium titanium oxide (Co0.94Li1.01Mg0.05Ti0.01O2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.94	7440-48-4
Ti	0.01	7440-32-6
Mg	0.05	7439-95-4
Li	1.01	7439-93-2

## 10/563,124-324074-EIC SEARCH

RN 719276-57-0 HCAPLUS  
 CN Cobalt lithium magnesium titanium oxide  
 (Co0.93Li1.01Mg0.05Ti0.03O2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.93	7440-48-4
Ti	0.03	7440-32-6
Mg	0.05	7439-95-4
Li	1.01	7439-93-2

IC ICM H01M004-52

INCL 429231300

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST cathode active material prepn  
 nonaq electrolyte secondary  
 battery

IT Secondary batteries  
 (lithium; method of producing cathode  
 active material for nonaq.  
 electrolyte secondary battery)

IT Battery cathodes  
 (method of producing cathode active  
 material for nonaq. electrolyte  
 secondary battery)

IT 141051-66-3P, Cobalt lithium oxide Co0.99Li1.01O2  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (Al- and Mg-doped; method of producing cathode  
 active material for nonaq.  
 electrolyte secondary battery)

IT 719276-48-9P, Cobalt lithium magnesium oxide  
 (Co0.94Li1.01Mg0.05O2) 719276-49-0P, Cobalt lithium magnesium  
 oxide (Co0.98Li1.01Mg0.01O2) 719276-50-3P, Cobalt lithium  
 magnesium oxide (Co0.98Li1.01Mg0.02O2) 719276-51-4P, Cobalt  
 lithium magnesium oxide (Co0.96Li1.01Mg0.03O2) 719276-52-5P,  
 Cobalt lithium magnesium oxide (Co0.92Li1.01Mg0.08O2)  
 719276-53-6P, Cobalt lithium magnesium oxide (Co0.9Li1.01Mg0.1O2)  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (Al-doped; method of producing cathode active  
 material for nonaq. electrolyte  
 secondary battery)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
 7782-42-5, Graphite, uses 14283-07-9, Lithium tetrafluoroborate  
 RL: DEV (Device component use); USES (Uses)  
 (method of producing cathode active  
 material for nonaq. electrolyte  
 secondary battery)

IT 719276-54-7P, Aluminum cobalt lithium magnesium oxide  
 (Al0.01Co0.94Li1.01Mg0.05O2) 719276-55-8P, Aluminum cobalt  
 lithium magnesium oxide (Al0.03Co0.93Li1.01Mg0.05O2)  
 719276-56-9P, Cobalt lithium magnesium titanium oxide  
 (Co0.94Li1.01Mg0.05Ti0.01O2) 719276-57-0P, Cobalt  
 lithium magnesium titanium oxide (Co0.93Li1.01Mg0.05Ti0.03O2)  
 719276-58-1P, Cobalt lithium magnesium strontium oxide  
 (Co0.94Li1.01Mg0.05Sr0.01O2) 719276-59-2P, Cobalt lithium  
 magnesium strontium oxide (Co0.93Li1.01Mg0.05Sr0.03O2)  
 719276-60-5P, Cobalt lithium magnesium manganese oxide  
 (Co0.94Li1.01Mg0.05Mn0.01O2) 719276-61-6P, Cobalt lithium  
 magnesium manganese oxide (Co0.93Li1.01Mg0.05Mn0.03O2)  
 719276-62-7P, Cobalt lithium magnesium nickel oxide  
 (Co0.94Li1.01Mg0.05Ni0.01O2) 719276-63-8P, Cobalt lithium  
 magnesium nickel oxide (Co0.93Li1.01Mg0.05Ni0.03O2)

## 10/563,124-324074-EIC SEARCH

719276-64-9P, Calcium cobalt lithium magnesium oxide  
(Ca0.01Co0.94Li1.01Mg0.05O2) 719276-65-0P, Calcium cobalt  
lithium magnesium oxide (Ca0.03Co0.93Li1.01Mg0.05O2)  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
(Preparation); USES (Uses)

(method of producing cathode active  
material for nonaq. electrolyte  
secondary battery)

- IT 7429-90-5, Aluminum, uses 7439-96-5, Manganese, uses  
7440-02-0, Nickel, uses 7440-24-6, Strontium, uses 7440-32-6,  
Titanium, uses 7440-70-2, Calcium, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(method of producing cathode active  
material for nonaq. electrolyte  
secondary battery)
- IT 554-13-2, Lithium carbonate 11113-74-9, Nickel hydroxide  
11129-60-5, Manganese oxide 13463-67-7, Titanium oxide,  
reactions 18480-07-4, Strontium hydroxide 21645-51-2, Aluminum  
hydroxide, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(method of producing cathode active  
material for nonaq. electrolyte  
secondary battery)
- IT 61179-07-5P, Cobalt magnesium hydroxide  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP  
(Preparation); RACT (Reactant or reagent)  
(method of producing cathode active  
material for nonaq. electrolyte  
secondary battery)
- OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE  
THIS RECORD (2 CITINGS)
- REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L75 ANSWER 22 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
ACCESSION NUMBER: 2004:589100 HCAPLUS Full-text  
DOCUMENT NUMBER: 141:126370  
TITLE: Cathode active

material for nonaqueous  
electrolyte secondary  
battery

INVENTOR(S): Nagayama, Masatoshi; Yoshizawa, Hiroshi  
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
Japan

SOURCE: U.S. Pat. Appl. Publ., 16 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20040142240	A1	20040722	US 2004-751920	2004 0107
			<--	
US 7381497	B2	20080603		
JP 2004220952	A	20040805	JP 2003-7916	2003 0116
			<--	
JP 4271448	B2	20090603		
CN 1518145	A	20040804	CN 2004-10002752	2004

## 10/563,124-324074-EIC SEARCH

0116

CN 1276532 C 20060920  
 PRIORITY APPLN. INFO.: JP 2003-7916 A  
 2003  
 0116

<--  
 ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 23 Jul 2004

AB The invention concerns a pos. electrode active material for a nonaq.  
 electrolyte secondary battery, comprising a lithium-containing composite oxide, wherein  
 the composite oxide is represented by the general formula:  $\text{Li}_2\text{Co}_{1-x-y-z}\text{Mg}_x\text{MyO}_2$ , the  
 element M included in the general formula is at least one selected from the group  
 consisting of Al, Ti, Sr, Mn, Ni and Ca, the values x, y and z included in the general  
 formula satisfy: (i)  $0 \leq x \leq 1.03$ ; (ii)  $0.005 \leq x \leq 0.1$ ; and (iii)  $0.001 \leq y \leq 0.03$ , the composite  
 oxide has a crystal structure attributed to a hexagonal system in an overcharged state  
 having a potential over 4.25 V relative to metallic Li, and a maximum value of an  
 oxygen generation peak in a gas chromatograph mass spectrometry measurement of the  
 composite oxide in the overcharged state is in the range of 330 to 370°.

IT 253868-42-7, Cobalt lithium magnesium titanium oxide  
 719276-56-9, Cobalt lithium magnesium titanium oxide  
 $\text{Co}_0.94\text{Li}_{1.01}\text{Mg}_{0.05}\text{Ti}_{0.01}\text{O}_2$  719276-57-0, Cobalt lithium  
 magnesium titanium oxide  $\text{Co}_0.93\text{Li}_{1.01}\text{Mg}_{0.05}\text{Ti}_{0.03}\text{O}_2$   
 721448-57-3, Cobalt lithium magnesium titanium oxide  
 ( $\text{Co}_0.9\text{Li}_{1.01}\text{Mg}_{0.05}\text{Ti}_{0.05}\text{O}_2$ )

RL: DEV (Device component use); USES (Uses)  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)

RN 253868-42-7 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Co	x	7440-48-4
Ti	x	7440-32-6
Mg	x	7439-95-4
Li	x	7439-93-2

RN 719276-56-9 HCAPLUS

CN Cobalt lithium magnesium titanium oxide  
 ( $\text{Co}_0.94\text{Li}_{1.01}\text{Mg}_{0.05}\text{Ti}_{0.01}\text{O}_2$ ) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.94	7440-48-4
Ti	0.01	7440-32-6
Mg	0.05	7439-95-4
Li	1.01	7439-93-2

RN 719276-57-0 HCAPLUS

CN Cobalt lithium magnesium titanium oxide  
 ( $\text{Co}_0.93\text{Li}_{1.01}\text{Mg}_{0.05}\text{Ti}_{0.03}\text{O}_2$ ) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.93	7440-48-4
Ti	0.03	7440-32-6
Mg	0.05	7439-95-4
Li	1.01	7439-93-2

## 10/563,124-324074-EIC SEARCH

RN 721448-57-3 HCAPLUS  
 CN Cobalt lithium titanium oxide  
 (Co0.9Li1.01Mg0.05Ti0.05O2) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.9	7440-48-4
Ti	0.05	7440-32-6
Mg	0.05	7439-95-4
Li	1.01	7439-93-2

IC ICM H01M004-52  
 INCL 429231100; 429231300; 429231600; 429231500; 429233000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST cathode active material  
 nonaq electrolyte secondary  
 battery  
 IT Battery cathodes  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)  
 IT Secondary batteries  
 (lithium; cathode active  
 material for nonaq. electrolyte  
 secondary battery)  
 IT 141051-66-3, Cobalt lithium oxide Co0.99Li1.01O2  
 RL: DEV (Device component use); USES (Uses)  
 (Al- and Mg-doped; cathode active  
 material for nonaq. electrolyte  
 secondary battery)  
 IT 719276-49-0, Cobalt lithium magnesium oxide (Co0.98Li1.01Mg0.01O2)  
 719276-50-3, Cobalt lithium magnesium oxide (Co0.98Li1.01Mg0.02O2)  
 719276-51-4, Cobalt lithium magnesium oxide (Co0.96Li1.01Mg0.03O2)  
 719276-52-5, Cobalt lithium magnesium oxide Co0.92Li1.01Mg0.08O2  
 719276-53-6, Cobalt lithium magnesium oxide Co0.9Li1.01Mg0.1O2  
 721448-55-1, Cobalt lithium magnesium oxide (Co0.95Li1.01Mg0.05O2)  
 RL: DEV (Device component use); USES (Uses)  
 (Al-doped; cathode active material  
 for nonaq. electrolyte secondary  
 battery)  
 IT 180997-14-2, Cobalt lithium magnesium nickel oxide  
 253868-42-7, Cobalt lithium magnesium titanium oxide  
 429678-65-9, Cobalt lithium magnesium manganese oxide  
 642999-49-3, Aluminum cobalt lithium magnesium oxide  
 719276-48-9, Cobalt lithium magnesium oxide (Co0.94Li1.01Mg0.05O2)  
 719276-54-7, Aluminum cobalt lithium magnesium oxide  
 Al0.01Co0.94Li1.01Mg0.05O2 719276-55-8, Aluminum cobalt lithium  
 magnesium oxide Al0.03Co0.93Li1.01Mg0.05O2 719276-56-9  
 , Cobalt lithium magnesium titanium oxide  
 Co0.94Li1.01Mg0.05Ti0.01O2 719276-57-0, Cobalt lithium  
 magnesium titanium oxide Co0.93Li1.01Mg0.05Ti0.03O2 719276-58-1,  
 Cobalt lithium magnesium strontium oxide  
 Co0.94Li1.01Mg0.05Sr0.01O2 719276-59-2, Cobalt lithium magnesium  
 strontium oxide Co0.93Li1.01Mg0.05Sr0.03O2 719276-60-5, Cobalt  
 lithium magnesium manganese oxide Co0.94Li1.01Mg0.05Mn0.01O2  
 719276-61-6, Cobalt lithium magnesium manganese oxide  
 Co0.93Li1.01Mg0.05Mn0.03O2 719276-62-7, Cobalt lithium magnesium  
 nickel oxide Co0.94Li1.01Mg0.05Ni0.01O2 719276-63-8, Cobalt  
 lithium magnesium nickel oxide Co0.93Li1.01Mg0.05Ni0.03O2  
 719276-64-9, Calcium cobalt lithium magnesium oxide  
 Ca0.01Co0.94Li1.01Mg0.05O2 719276-65-0, Calcium cobalt lithium  
 magnesium oxide Ca0.03Co0.93Li1.01Mg0.05O2 721430-98-4, Cobalt  
 lithium magnesium strontium oxide 721430-99-5, Calcium cobalt  
 lithium magnesium oxide 721448-51-7, Cobalt lithium magnesium

## 10/563,124-324074-EIC SEARCH

oxide (Co0.94Li1.04Mg0.05O2) 721448-52-8, Cobalt lithium  
 magnesium oxide (Co0.94Li1.03Mg0.05O2) 721448-53-9, Cobalt  
 lithium magnesium oxide (Co0.94LiMg0.05O2) 721448-56-2, Aluminum  
 cobalt lithium magnesium oxide (Al0.05Co0.9Li1.01Mg0.05O2)  
 721448-57-3, Cobalt lithium magnesium titanium oxide  
 (Co0.9Li1.01Mg0.05Ti0.05O2) 721448-58-4, Cobalt lithium  
 magnesium strontium oxide (Co0.9Li1.01Mg0.05Sr0.05O2)  
 721448-59-5, Cobalt lithium magnesium manganese oxide  
 (Co0.9Li1.01Mg0.05Mn0.05O2) 721448-60-8, Cobalt lithium  
 magnesium nickel oxide (Co0.9Li1.01Mg0.05Ni0.05O2) 721448-61-9,  
 Calcium cobalt lithium magnesium oxide (Ca0.05Co0.9Li1.01Mg0.05O2)  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material for  
 nonaq. electrolyte secondary  
 battery)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
 THIS RECORD (1 CITINGS)  
 REFERENCE COUNT: 6 THERE ARE 6 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 23 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
 ACCESSION NUMBER: 2004:533748 HCAPLUS Full-text  
 DOCUMENT NUMBER: 141:74296  
 TITLE: Nonaqueous electrolyte  
 rechargeable battery  
 INVENTOR(S): Nagayama, Masatoshi; Yoshizawa, Hiroshi  
 PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
 Japan  
 SOURCE: U.S. Pat. Appl. Publ., 9 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20040126661	A1	20040701	US 2003-730049	2003 1209
US 7255963	B2	20070814	<--	
JP 2004207120	A	20040722	JP 2002-376664	2002 1226
JP 3844733	B2	20061115	<--	
PRIORITY APPLN. INFO.:			JP 2002-376664	A 2002 1226

ED Entered STN: 02 Jul 2004

AB A nonaq. electrolyte rechargeable battery includes: (a) a pos. electrode capable of charging and discharging lithium; (b) a neg. electrode capable of charging and discharging lithium; (c) a separator or a lithium ion conductive layer interposed between the pos. electrode and the neg. electrode; and (d) a lithium ion conductive nonaq. electrolyte, wherein the pos. electrode contains a mixture of a first pos. electrode active material and a second pos. electrode active material, the first pos. electrode active material includes lithium oxide containing manganese, the lithium oxide further contains aluminum and/or magnesium, and the second pos. electrode active material includes  $\text{Li}_{1-x}\text{Co}_x\text{-y-zMg}_y\text{Al}_z\text{O}_2$  where  $1 \leq x \leq 1.03$ ,  $0.005 \leq y \leq 0.1$  and  $0.001 \leq z \leq 0.02$ .

IT 709654-49-9, Cobalt lithium magnesium titanium oxide  
 (Co0.94LiMg0.05Ti0.01O2)

## 10/563,124-324074-EIC SEARCH

RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte rechargeable  
 battery)

RN 709654-49-9 HCAPLUS

CN Cobalt lithium magnesium titanium oxide (Co0.94LiMg0.05Ti0.01O2)  
 (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Co	0.94	7440-48-4
Ti	0.01	7440-32-6
Mg	0.05	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-50

INCL 429224000; 429231300; 429231600; 429231100

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST nonaq electrolyte rechargeable battery

IT Battery cathodes

Secondary batteries

(nonaq. electrolyte rechargeable  
 battery)

IT 96-49-1, Ethylene carbonate 623-53-0, Ethyl methyl carbonate  
 7782-42-5, Graphite, uses 21324-40-3, Lithium  
 hexafluorophosphate 61179-01-9, Aluminum lithium manganese oxide  
 136479-37-3, Lithium magnesium manganese oxide LiMg0.2Mn1.8O4  
 142447-12-9, Cobalt lithiummanganese oxide Co0.95LiMn0.05O2  
 145896-60-2, Aluminum lithium manganese oxide Al0.2LiMn1.8O4  
 175786-46-6, Lithium magnesium manganese oxide 184092-89-5,  
 Cobalt lithium titanium oxide Co0.95LiTi0.05O2 186298-17-9,  
 Aluminum cobalt lithium manganese nickel oxide 193216-10-3,  
 Aluminum cobalt lithium manganese nickel oxide  
 Al0.1Co0.1LiMn0.4Ni0.4O2 347175-77-3, Aluminum Lithium magnesium  
 manganese oxide 372491-83-3, Aluminum cobalt lithium magnesium  
 oxide Al0.01Co0.94LiMg0.05O2 433969-25-6, Aluminum Cobalt  
 lithium magnesium manganese nickel oxide 478037-17-1, Cobalt  
 lithium magnesium manganese nickel oxide 642999-49-3, Aluminum  
 cobalt lithium magnesium oxide 709654-46-6 709654-47-7,  
 Aluminum cobalt lithium oxide (Al0.05Co0.9LiO2) 709654-48-8,  
 Cobalt lithium magnesium manganese oxide (Co0.94LiMg0.05Mn0.01O2)  
 709654-49-9, Cobalt lithium magnesium titanium oxide  
 (Co0.94LiMg0.05Ti0.01O2) 709654-50-2, Cobalt lithium manganese  
 titanium oxide (Co0.95LiMn0.02Ti0.02O2) 709654-51-3, Aluminum  
 cobalt lithium manganese oxide (Al0.02Co0.95LiMn0.02O2)

RL: DEV (Device component use); USES (Uses)  
 (nonaq. electrolyte rechargeable  
 battery)

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE  
 THIS RECORD (3 CITINGS)  
 REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L75 ANSWER 24 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2003:796193 HCAPLUS Full-text

DOCUMENT NUMBER: 139:310049

TITLE: Batteries comprising  
 alkali-transition metal phosphates and  
 preferred electrolytes

INVENTOR(S): Pugh, James; Saidi, Mohammed Y.; Huang, Haitao  
 PATENT ASSIGNEE(S): USA

SOURCE: U.S. Pat. Appl. Publ., 24 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

## 10/563,124-324074-EIC SEARCH

FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20030190527	A1	20031009	US 2002-116276	2002 0403
			<--	
CA 2479790	A1	20031016	CA 2003-2479790	2003 0327
			<--	
WO 2003085757	A1	20031016	WO 2003-US9634	2003 0327
			<--	
W:	AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MY, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW			
RW:	GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SH, TD, TG			
AU 2003224801	A1	20031020	AU 2003-224801	2003 0327
			<--	
EP 1490917	A1	20041229	EP 2003-721492	2003 0327
			<--	
R:	AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK			
JP 2005522009	T	20050721	JP 2003-582838	2003 0327
			<--	
CN 1650450	A	20050803	CN 2003-810033	2003 0327
			<--	
US 20050181283	A1	20050818	US 2005-80605	2005 0315
			<--	
PRIORITY APPLN. INFO.:			US 2002-116276	A 2002 0403
			<--	
			WO 2003-US9634	W 2003 0327
			<--	

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 10 Oct 2003

AB Lithium batteries comprising: (a) an electrode comprising a material  $AaMb(XY_4)cZd$ , wherein (i) A is an alkali metal and  $0 < a \leq 9$ ; (ii) M comprises a transition metal, and  $1 \leq b \leq 3$ ; (iii)  $XY_4$  is  $X'O_4-x Y'x$ ,  $X'O_4-yY'2y$ ,  $X''S_4$ , or mixts. thereof, where X' is P,



# 10/563,124-324074-EIC SEARCH

As, Sb, Si, Ge, V, S, or mixts. thereof; X' is P, As, Sb, Si, Ge, V, or mixts. thereof; Y' is halogen, S, N, or mixts. thereof;  $0 \leq x < 3$ ; and  $0 < y \leq 2$ ; and  $0 < c \leq 3$ ; and (iv) Z is OH, halogen, or mixts. thereof, and  $0 \leq d \leq 6$ ; and (b) a counter-electrode; and (c) an electrolyte comprising an alkyl and/or alkylene carbonate and a cyclic ester. Preferably, M addnl. comprises at least one non-transition metal. Preferred embodiments include those having an olivine structure, where  $c = 1$ , and those having a NASICON structure, where  $c = 3$ .

IT 105-58-8, Diethyl carbonate  
610310-97-9 610321-55-6  
RL: DEV (Device component use); USES (Uses)  
(batteries comprising alkali-transition metal  
phosphates and preferred electrolytes)  
RN 105-58-8 HCAPLUS  
CN Carbonic acid, diethyl ester (CA INDEX NAME)



RN 610310-97-9 HCAPLUS  
CN Cobalt iron lithium magnesium titanium phosphate  
(Co<sub>0.8</sub>Fe<sub>0.1</sub>LiMg<sub>0.05</sub>Ti<sub>0.02</sub>(PO<sub>4</sub>)) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O4P	1	14265-44-2
Co	0.8	7440-48-4
Ti	0.02	7440-32-6
Mg	0.05	7439-95-4
Li	1	7439-93-2
Fe	0.1	7439-89-6

RN 610321-55-6 HCAPLUS  
CN Cobalt iron lithium magnesium titanium fluoride metaphosphate  
oxide (Co<sub>0.8</sub>Fe<sub>0.1</sub>Li<sub>1.02</sub>Mg<sub>0.02</sub>Ti<sub>0.02</sub>F<sub>0.02</sub>(PO<sub>3</sub>)O<sub>0.98</sub>) (CA INDEX  
NAME)

Component	Ratio	Component Registry Number
O	0.98	17778-80-2
O3P	1	15389-19-2
F	0.02	14762-94-8
Co	0.8	7440-48-4
Ti	0.02	7440-32-6
Mg	0.02	7439-95-4
Li	1.02	7439-93-2
Fe	0.1	7439-89-6

IC ICM H01M004-58  
INCL 429231900; 429231950; 429221000; 429223000; 429231500; 429224000;  
429231600  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST lithium battery cathode alkali  
transition metal phosphate  
IT Battery cathodes  
Battery electrolytes  
(batteries comprising alkali-transition metal  
phosphates and preferred electrolytes)  
IT Chalcogenides  
Oxides (inorganic), uses

## 10/563,124-324074-EIC SEARCH

RL: DEV (Device component use); USES (Uses)  
 (batteries comprising alkali-transition metal  
 phosphates and preferred electrolytes)

IT Carbonates, uses  
 RL: DEV (Device component use); USES (Uses)  
 (esters; batteries comprising alkali-transition metal  
 phosphates and preferred electrolytes)

IT Secondary batteries  
 (lithium; batteries comprising  
 alkali-transition metal phosphates and preferred  
 electrolytes)

IT 57-57-8,  $\beta$ -Propiolactone 96-48-0,  $\gamma$ -Butyrolactone  
 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
 carbonate 108-32-7, 1,2-Propylene carbonate 502-44-3,  
 $\epsilon$ -Caprolactone 542-28-9,  $\delta$ -Valerolactone  
 616-38-6, Dimethyl carbonate 623-53-0, Ethyl methyl carbonate  
 2453-03-4, 1,3-Propylene carbonate 4427-90-1, 1,5-Pentylene  
 carbonate 4427-94-5, 1,4-Butylene carbonate 4437-70-1,  
 2,3-Butylene carbonate 4437-85-8, 1,2-Butylene carbonate  
 7440-44-0, Carbon, uses 7550-35-8, Lithium bromide  
 (LiBr) 7782-42-5, Graphite, uses 7791-03-9, Lithium  
 perchlorate 14024-11-4, Lithium tetrachloroaluminate  
 14283-07-9, Lithium tetrafluoroborate 14485-20-2,  
 Lithium tetraphenylborate 15365-14-7, Iron  
 lithium phosphate  $\text{LiFePO}_4$  21324-40-3, Lithium  
 hexafluorophosphate 29935-35-1, Lithium  
 hexafluoroarsenate 33454-82-9, Lithium triflate  
 90076-65-6 132843-44-8 610271-90-4 610271-94-8 610272-06-5  
 610310-87-7 610310-88-8 610310-92-4 610310-95-7  
 610310-97-9 610310-99-1 610311-00-7  
 610321-55-6 610321-60-3 610754-69-3

RL: DEV (Device component use); USES (Uses)  
 (batteries comprising alkali-transition metal  
 phosphates and preferred electrolytes)

IT 477779-87-6P, Sodium vanadium fluoride phosphate  $\text{NaVF}(\text{PO}_4)$   
 484040-01-9P, Iron lithium magnesium fluoride phosphate  
 $\text{FeO}_9\text{Li}_{1.25}\text{MgO}_{1.0}\text{F}_{0.25}(\text{PO}_4)$  484040-22-4P, Lithium vanadium  
 fluoride phosphate  $(\text{Li}_6\text{V}_2\text{F}(\text{PO}_4)_3)$  484040-28-0P 610272-07-6P  
 610311-01-8P

RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (batteries comprising alkali-transition metal  
 phosphates and preferred electrolytes)

OS.CITING REF COUNT: 2 THERE ARE 2 CAPLUS RECORDS THAT CITE  
 THIS RECORD (2 CITINGS)

L75 ANSWER 25 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2003:773745 HCAPLUS Full-text

DOCUMENT NUMBER: 139:294543

TITLE: Cathode material for  
nonaqueous electrolyte  
electric batteryINVENTOR(S): Sawa, Takao; Kono, Tatsuoki; Matsuno,  
Shinsuke; Takami, Norio

PATENT ASSIGNEE(S): Toshiba Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 18 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003282053	A	20031003	JP 2002-84509	

## 10/563,124-324074-EIC SEARCH

2002  
0325

PRIORITY APPLN. INFO.:

JP 2002-84509

2002  
0325

ED Entered STN: 03 Oct 2003

AB The title battery is characterized by having good charging capacity, long cycle lifetime, good charging rate, and being able to reach maximum capacity with min. charging/discharging time. The cathode material is an amorphous phase-formed alloy having the following general formula:  $AaMbTcXdZe$  or  $[AaMbTcXdZe]xLi_y$ , where A consists of 21 elements selected from Ca, Sr, and Ba or a composite containing the above elements and alkaline earth metal elements; M consists of 21 elements selected from Ni and Cu; T selected from Si, Al, In, Ge, P, Pb, Bi, Sb, Zn, Ga, and C; X selected from Fe, Co, Mn, Cr, Ti, V, Zr, Nb, Hf, Ta, Mo, W, and rare earth elements; and Z containing elements selected from O, C, H, and N.

IT 609780-97-4

RL: DEV (Device component use); USES (Uses)  
(cathode material; cathode material for  
nonaq. electrolyte elec. battery)

RN 609780-97-4 HCAPLUS

CN Strontium alloy, base, Sr 34, Ba 27, Cu 17, Co 15, Zr 2.4, O 1.9, Si 1.5, Li 1 (9CI) (CA INDEX NAME)

Component	Component Percent	Component Registry Number
Sr	34	7440-24-6
Ba	27	7440-39-3
Cu	17	7440-50-8
Co	15	7440-48-4
Zr	2.4	7440-67-7
O	1.9	17778-80-2
Si	1.5	7440-21-3
Li	1	7439-93-2

IC ICM H01M004-38

ICS C22C045-04; H01M004-02; H01M004-06; H01M006-16; H01M010-40

CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 76

ST cathode material nonaq electrolyte  
elec battery

IT Alkaline earth metals

Fluoropolymers, uses  
RL: DEV (Device component use); USES (Uses)  
(cathode material containing; cathode material  
for nonaq. electrolyte elec.  
battery)

IT Cathodes

(cathode material for nonaq.  
electrolyte elec. battery)

IT Primary batteries

(elec.; cathode material for nonaq.  
electrolyte elec. battery)

IT 96-49-1, Ethylene carbonate 623-53-0, Methyl ethyl carbonate  
872-50-4, N-Methyl-2-pyrrolidone, uses 1333-74-0, Hydrogen, uses  
7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-92-1,  
Lead, uses 7439-93-2, Lithium, uses 7439-96-5, Manganese, uses  
7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-03-1,  
Niobium, uses 7440-21-3, Silicon, uses 7440-24-6, Strontium,  
uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses  
7440-33-7, Tungsten, uses 7440-36-0, Antimony, uses 7440-39-3,  
Barium, uses 7440-44-0, Carbon, uses 7440-47-3, Chromium, uses  
7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-55-3,  
Gallium, uses 7440-56-4, Germanium, uses 7440-58-6, Hafnium,

# 10/563,124-324074-EIC SEARCH

uses 7440-62-2, Vanadium, uses 7440-66-6, Zinc, uses  
7440-67-7, Zirconium, uses 7440-69-9, Bismuth, uses 7440-70-2,  
Calcium, uses 7440-74-6, Indium, uses 7723-14-0, Phosphorus,  
uses 7727-37-9, Nitrogen, uses 7782-42-5, Graphite, uses  
7782-44-7, Oxygen, uses 11099-26-6 21324-40-3, Lithium  
hexafluorophosphate 24937-79-9, PolyfluoroVinylidene  
52627-24-4, Lithium cobalt oxide

RL: DEV (Device component use); USES (Uses)  
(cathode material containing; cathode material  
for nonaq. electrolyte elec.  
battery)

IT	609779-59-1	609779-62-6	609779-64-8	609779-66-0
	609779-68-2	609779-72-8	609779-74-0	609779-76-2
	609779-78-4	609779-80-8	609779-82-0	609779-86-4
	609779-88-6	609779-91-1	609779-96-6	609780-00-9
	609780-03-2	609780-05-4	609780-07-6	609780-10-1
	609780-13-4	609780-15-6	609780-17-8	609780-19-0
	609780-22-5	609780-24-7	609780-26-9	609780-28-1
	609780-32-7	609780-34-9	609780-37-2	609780-40-7
	609780-44-1	609780-47-4	609780-50-9	609780-53-2
	609780-57-6	609780-60-1	609780-63-4	609780-66-7
	609780-69-0	609780-73-6	609780-75-8	609780-78-1
	609780-81-6	609780-83-8	609780-85-0	609780-88-3
	609780-90-7	609780-94-1	609780-97-4	609781-00-2
	609781-02-4	609781-06-8	609781-09-1	609781-12-6
	609781-16-0	609781-19-3	609781-21-7	609781-25-1
	609781-28-4	609781-34-2	609781-38-6	609781-42-2
	609781-45-5	609781-49-9	609781-52-4	609781-57-9
	609781-60-4	609781-63-7	609781-66-0	609781-70-6
	609781-73-9	609781-76-2	609781-79-5	609781-83-1

RL: DEV (Device component use); USES (Uses)  
(cathode material; cathode material for  
nonaq. electrolyte elec. battery)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
THIS RECORD (1 CITINGS)

L75 ANSWER 26 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2003:757154 HCAPLUS Full-text

DOCUMENT NUMBER: 139:263344

TITLE: Layered electrodes for lithium cells  
and batteries

INVENTOR(S): Johnson, Christopher S.; Thackeray, Michael  
M.; Vaughey, John T.; Kahaian, Arthur J.; Kim,  
Jeom-soo

PATENT ASSIGNEE(S): The University of Chicago, USA; UChicago  
Argonne, LLC

SOURCE: U.S. Pat. Appl. Publ., 28 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 20030180616	A1	20030925	US 2003-365286	2003 0212
US 7358009	B2	20080415		
PRIORITY APPLN. INFO.:			US 2002-357393P	P 2002 0215

ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 26 Sep 2003

## 10/563,124-324074-EIC SEARCH

AB Lithium metal oxide compds. of nominal formula  $\text{Li}_2\text{MO}_2$ , in which M represents two or more pos. charged metal ions, selected predominantly and preferably from the first row of transition metals are disclosed herein. The  $\text{Li}_2\text{MO}_2$  compds. have a layered-type structure, which can be used as pos. electrodes for lithium electrochem. cells, or as a precursor for the in-situ electrochem. fabrication of  $\text{LiMO}_2$  electrodes. The  $\text{Li}_2\text{MO}_2$  compds. of the invention may have addnl. functions in lithium cells, for example, as end-of-discharge indicators, or as neg. electrodes for lithium cells.

IT 105-58-8, Diethyl carbonate  
 RL: DEV (Device component use); USES (Uses)  
 (layered electrodes for lithium cells and batteries)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)



IT 309242-27-1P, Cobalt lithium magnesium nickel titanium oxide  $\text{Co}_0.15\text{LiMg}_0.05\text{Ni}_0.75\text{Ti}_0.05\text{O}_2$   
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (layered electrodes for lithium cells and batteries)

RN 309242-27-1 HCAPLUS

CN Cobalt lithium magnesium nickel titanium oxide  
 ( $\text{Co}_0.15\text{LiMg}_0.05\text{Ni}_0.75\text{Ti}_0.05\text{O}_2$ ) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.15	7440-48-4
Ti	0.05	7440-32-6
Ni	0.75	7440-02-0
Mg	0.05	7439-95-4
Li	1	7439-93-2

IC ICM H01M004-48  
 ICS H01M004-52; H01M004-50; H01M004-62; C01G045-12; C01G049-02;  
 C01G023-04; C01G051-04; C01G053-04

INCL 429231100; X42-923.2; X42-923.12; X42-923.15; X42-922.4;  
 X42-922.3; X42-922.1; X42-922.0; X42-359.31; X42-359.42

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 49

ST lithium battery layered electrode

IT Battery cathodes  
 Battery electrodes  
 (layered electrodes for lithium cells and batteries)

IT Metals  
 Oxides (inorganic)  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
 (layered electrodes for lithium cells and batteries)

IT Intermetallic compounds  
 Nitrides  
 RL: DEV (Device component use); USES (Uses)  
 (layered electrodes for lithium cells and batteries)

IT Inorganic compounds  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP

## 10/563,124-324074-EIC SEARCH

(Preparation); USES (Uses)

(layered; layered electrodes for lithium cells and batteries)

IT Secondary batteries

(lithium; layered electrodes for lithium cells and batteries)

IT 109-72-8, n-Butyllithium, processes 546-68-9 1310-66-3, Lithium hydroxide monohydrate 7308-67-0, Lithium naphthalide, processes 7439-93-2, Lithium, processes 7440-44-0, Carbon, processes 7782-42-5, Graphite, processes 244129-80-4, Manganese nickel hydroxide  $\text{Mn}_0.5\text{Ni}_0.5(\text{OH})_2$   
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)

(layered electrodes for lithium cells and batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 21324-40-3, Lithium hexafluorophosphate

RL: DEV (Device component use); USES (Uses)  
 (layered electrodes for lithium cells and batteries)

IT 12031-65-1P, Lithium nickel oxide  $\text{LiNiO}_2$  12162-79-7P, Lithium manganese oxide  $\text{LiMnO}_2$  12190-79-3P, Cobalt lithium oxide  $\text{CoLiO}_2$  13824-63-0P, Cobalt lithium phosphate  $\text{CoLiPO}_4$  13826-59-0P, Lithium manganese phosphate  $\text{LiMnPO}_4$  15365-14-7P, Iron lithium phosphate  $\text{FeLiPO}_4$  128975-24-6DP, Lithium manganese nickel oxide  $\text{LiMn}_0.5\text{Ni}_0.5\text{O}_2$ , Li intercalated 128975-24-6P, Lithium manganese nickel oxide  $\text{LiMn}_0.5\text{Ni}_0.5\text{O}_2$  176087-62-0P, Lithium manganese oxide  $\text{Li}_1-1.33\text{Mn}_{1.67-2.04}$  193214-24-3P, Aluminum cobalt lithium nickel oxide  $\text{Al}_0.05\text{Co}_0.15\text{LiNi}_0.8\text{O}_2$  309242-27-1P, Cobalt lithium magnesium nickel titanium oxide  $\text{Co}_0.15\text{LiMg}_0.05\text{Ni}_0.75\text{Ti}_0.05\text{O}_2$  346417-97-8P, Cobalt lithium manganese nickel oxide  $\text{Co}_0.33\text{LiMn}_0.33\text{Ni}_0.33\text{O}_2$  448897-02-7DP, Lithium manganese nickel titanium oxide  $\text{Li}_1.02\text{Mn}_0.46\text{Ni}_0.46\text{Ti}_0.05\text{O}_2$ , Li intercalated 448897-02-7P, Lithium manganese nickel titanium oxide  $\text{Li}_1.02\text{Mn}_0.46\text{Ni}_0.46\text{Ti}_0.05\text{O}_2$  602319-07-3P, Lithium manganese nickel titanium oxide ( $\text{Li}_1.02\text{Mn}_0.46\text{Ni}_0.46\text{Ti}_0.05\text{O}_2$ )

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
 (layered electrodes for lithium cells and batteries)

IT 7664-41-7, Ammonia, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)  
 (lithium solution; layered electrodes for lithium cells and batteries)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (1 CITINGS)

REFERENCE COUNT: 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L75 ANSWER 27 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2003:219342 HCAPLUS Full-text

DOCUMENT NUMBER: 138:257830

TITLE: Cathode active mass and secondary lithium battery

INVENTOR(S): Takeuchi, Hajime; Endo, Shota; Amanomiya, Kazuki; Tanaka, Hiromasa; Sakai, Akira; Shirakawa, Yasuhiro; Oya, Yasumasa  
 PATENT ASSIGNEE(S): Toshiba Corp., Japan; Toshiba Electronic Engineering Corp.

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

## 10/563,124-324074-EIC SEARCH

FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003086181	A	20030320	JP 2001-275080	2001 0911

PRIORITY APPLN. INFO.: <--  
JP 2001-275080  
2001  
0911

ED Entered STN: 20 Mar 2003

AB The active mass comprises a hexagonal structured oxide:  $\text{Li}_x\text{Co}_{1-y}\text{M}'\text{yO}_2$  or  $\text{Li}_x\text{Co}_{1-y}\text{M}'\text{yO}_{2-y}$  (M is  $\geq 1$  metal element having ion radius larger than  $\text{Co}^{3+}$  and average valence of 3; M' is  $\geq 1$  metal element having ion radius larger than  $\text{Co}^{3+}$  and average valence of 2;  $x = 0.4-2.0$ ;  $0 < y \leq 0.2$ ). The battery has a cathode containing the above described active mass, an anode, a separator between the 2 electrodes in a battery case, and an electrolyte filled inside the battery case.

IT 502616-40-2, Cobalt lithium magnesium titanium oxide  
( $\text{Co}_0.8\text{LiMg}_0.1\text{Ti}_0.1\text{O}_2$ ) 502616-41-3, Calcium cobalt  
lithium zirconium oxide ( $\text{Ca}_0.1\text{Co}_0.8\text{LiZr}_0.1\text{O}_2$ )  
502616-42-4, Cobalt hafnium lithium magnesium oxide  
( $\text{Co}_0.8\text{Hf}_0.1\text{LiMg}_0.1\text{O}_2$ )  
RL: DEV (Device component use); USES (Uses)  
(compos. of cathodes containing lithium cobalt composite  
oxides for secondary lithium  
batteries)

RN 502616-40-2 HCAPLUS  
CN Cobalt lithium magnesium titanium oxide ( $\text{Co}_0.8\text{LiMg}_0.1\text{Ti}_0.1\text{O}_2$ ) (CA  
INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.8	7440-48-4
Ti	0.1	7440-32-6
Mg	0.1	7439-95-4
Li	1	7439-93-2

RN 502616-41-3 HCAPLUS  
CN Calcium cobalt lithium zirconium oxide ( $\text{Ca}_0.1\text{Co}_0.8\text{LiZr}_0.1\text{O}_2$ ) (CA  
INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Ca	0.1	7440-70-2
Zr	0.1	7440-67-7
Co	0.8	7440-48-4
Li	1	7439-93-2

RN 502616-42-4 HCAPLUS  
CN Cobalt hafnium lithium magnesium oxide ( $\text{Co}_0.8\text{Hf}_0.1\text{LiMg}_0.1\text{O}_2$ ) (CA  
INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Hf	0.1	7440-58-6
Co	0.8	7440-48-4

## 10/563,124-324074-EIC SEARCH

Mg | 0.1 | 7439-95-4  
Li | 1 | 7439-93-2

IC ICM H01M004-58  
ICS H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary battery cathode  
lithium cobalt composite oxide compn

IT Battery cathodes  
(comps. of cathodes containing lithium cobalt composite  
oxides for secondary lithium  
batteries)

IT 21332-84-9, Cobalt gallium lithium oxide (Co0.9Ga0.1LiO2)  
502616-36-6, Cobalt lithium magnesium fluoride oxide  
(Co0.9LiMg0.1F0.1O1.9) 502616-37-7, Cobalt lithium magnesium  
fluoride oxide (Co0.8LiMg0.2F0.2O1.8) 502616-38-8, Cobalt indium  
lithium oxide (Co0.8In0.2LiO2) 502616-39-9, Cobalt lithium  
thallium oxide (Co0.9LiTl0.1O2) 502616-40-2, Cobalt  
lithium magnesium titanium oxide (Co0.8LiMg0.1Ti0.1O2)  
502616-41-3, Calcium cobalt lithium zirconium oxide  
(Ca0.1Co0.8LiZr0.1O2) 502616-42-4, Cobalt hafnium  
lithium magnesium oxide (Co0.8Hf0.1LiMg0.1O2)  
RL: DEV (Device component use); USES (Uses)  
(comps. of cathodes containing lithium cobalt composite  
oxides for secondary lithium  
batteries)

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE  
THIS RECORD (1 CITINGS)

L75 ANSWER 28 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
ACCESSION NUMBER: 2003:173992 HCAPLUS Full-text  
DOCUMENT NUMBER: 138:224204  
TITLE: Battery  
INVENTOR(S): Adachi, Momoe; Fujita, Shigeru; Endo, Takuya;  
Iwakoshi, Yasunobu; Shibamoto, Goro  
PATENT ASSIGNEE(S): Sony Corporation, Japan  
SOURCE: PCT Int. Appl., 162 pp.  
CODEN: PIXXD2  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
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WO 2003019713	A1	20030306	WO 2002-JP8498	2002 0823
<--				
W: CN, JP, KR, US RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR				
EP 1443584	A1	20040804	EP 2002-762828	2002 0823
<--				
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI, CY, TR, BG, CZ, EE, SK				
CN 1557036	A	20041222	CN 2002-818384	2002 0823
<--				
CN 1314159	C	20070502		
CN 1770542	A	20060510	CN 2005-10113835	2002 0823



# 10/563,124-324074-EIC SEARCH

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CN 100448095      C      20081231
CN 1770543      A      20060510      CN 2005-10113836      2002
                                                0823

                                <--
CN 100446336      C      20081224
KR 2010004115      A      20100112      KR 2009-724824      2002
                                                0823

                                <--
US 20040234853      A1      20041125      US 2004-486635      2004
                                                0211

                                <--
US 7510803      B2      20090331
PRIORITY APPLN. INFO.:      JP 2001-254547      A      2001
                                                0824

                                <--
                                CN 2002-818384      A3      2002
                                                0823

                                <--
                                WO 2002-JP8498      W      2002
                                                0823

                                <--
                                KR 2004-702675      A3      2004
                                                0223

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## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 07 Mar 2003

AB The battery has a cathode, containing a Li composite oxide active mass having Li and/or Ni and O, an anode containing a Li intercalating material and/or Li in its active mass, and an electrolyte-impregnated separator in between; where the battery has charging voltage  $\geq 4.25$  V, and a total amount of Li carbonate and Li sulfate is 1.0 mass % of the cathode active mass. Preferably, the electrolyte has the concentration of a proton impurity  $\leq 20$  ppm and water  $\leq 20$  ppm.

IT 872-36-6, Vinylene carbonate  
500868-02-0

RL: DEV (Device component use); USES (Uses)  
(secondary lithium batteries  
containing electrolytes, Li or Li-intercalating  
anodes and Li composite oxide cathodes with  
controlled concentration of  $\text{Li}_2\text{CO}_3$  and  $\text{Li}_2\text{SO}_4$ )

RN 872-36-6 HCAPLUS

CN 1,3-Dioxol-2-one (CA INDEX NAME)



RN 500868-02-0 HCAPLUS

CN Cobalt lithium magnesium nickel titanium oxide  
( $\text{Co}_0.3\text{LiMg}_0.05\text{Ni}_0.5\text{Ti}_{10.15}\text{O}_2$ ) (CA INDEX NAME)

Component	Ratio	Component Registry Number
----- ----- -----		
O	2	17778-80-2
Co	0.3	7440-48-4

## 10/563,124-324074-EIC SEARCH

Ti		0.15		7440-32-6
Ni		0.5		7440-02-0
Mg		0.05		7439-95-4
Li		1		7439-93-2

IC ICM H01M010-40  
ICS H01M004-02; H01M004-58; H01M004-40; H01M004-38

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium battery structure  
high charging voltage energy d

IT Secondary batteries  
(lithium; secondary lithium  
batteries containing electrolytes, Li or  
Li-intercalating anodes and Li composite oxide  
cathodes with controlled concentration of Li2CO3 and Li2SO4)

IT 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses 12668-36-9  
RL: DEV (Device component use); USES (Uses)  
(anode; secondary lithium  
batteries containing electrolytes, Li or  
Li-intercalating anodes and Li composite oxide  
cathodes with controlled concentration of Li2CO3 and Li2SO4)

IT 12190-79-3, Cobalt lithium oxide (CoLiO2)  
RL: DEV (Device component use); USES (Uses)  
(cathode; secondary lithium  
batteries containing electrolytes, Li or  
Li-intercalating anodes and Li composite oxide  
cathodes with controlled concentration of Li2CO3 and Li2SO4)

IT 7791-03-9, Lithium perchlorate 14283-07-9, Lithium  
tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
90076-65-6 132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(electrolyte; secondary lithium  
batteries containing electrolytes, Li or  
Li-intercalating anodes and Li composite oxide  
cathodes with controlled concentration of Li2CO3 and Li2SO4)

IT 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate  
108-32-7, Propylene carbonate 616-38-6, Dimethyl carbonate  
872-36-6, Vinylene carbonate  
4427-96-7, Vinyl ethylene carbonate 12031-65-1, Lithium nickel  
oxide (LiNiO2) 113066-92-5, Cobalt lithium nickel oxide  
(Co0.9LiNi0.1O2) 118557-79-2, Cobalt iron lithium oxide (Co0.9Fe  
0.1LiO2) 128975-24-6, Lithium manganese nickel oxide  
(LiMn0.5Ni0.5O2) 185746-84-3, Aluminum lithium magnesium nickel  
oxide (Al0.05LiMg0.05Ni0.9O2) 202916-35-6, Chromium cobalt  
lithium nickel oxide (Cr0.05Co0.2LiNi0.75O2) 287718-97-2,  
Aluminum lithium manganese nickel oxide (Al0.05LiMn0.05Ni0.9O2)  
346417-97-8, Cobalt lithium manganese nickel oxide  
(Co0.33LiMn0.33Ni0.33O2) 364589-12-8, Aluminum cobalt lithium  
titanium oxide (Al0.05Co0.9LiTi0.05O2) 475637-37-7, Aluminum  
cobalt lithium nickel oxide (Al0.05Co0.8LiNi0.15O2) 478814-69-6,  
Aluminum cobalt lithium magnesium oxide (Al0.05Co0.9LiMg0.05O2)  
500867-92-5, Cobalt lithium magnesium manganese oxide  
(Co0.8LiMg0.05Mn0.15O2) 500867-93-6, Aluminum iron lithium  
nickel oxide (Al0.15Fe0.05LiNi0.8O2) 500867-94-7, Aluminum  
cobalt lithium nickel oxide (Al0.2Co0.3LiNi0.5O2) 500867-98-1,  
Cobalt lithium magnesium nickel oxide (Co0.45LiMg0.05Ni0.5O2)  
500867-99-2, Cobalt lithium nickel titanium oxide  
(Co0.35LiNi0.6Ti0.05O2) 500868-00-8, Cobalt iron lithium nickel  
oxide (Co0.25Fe0.1LiNi0.65O2) 500868-01-9 500868-02-0  
500868-03-1 500868-04-2 500868-05-3 500868-09-7  
500868-10-0 500868-11-1 500868-12-2  
RL: DEV (Device component use); USES (Uses)  
(secondary lithium batteries  
containing electrolytes, Li or Li-intercalating  
anodes and Li composite oxide cathodes with  
controlled concentration of Li2CO3 and Li2SO4)

# 10/563,124-324074-EIC SEARCH

OS.CITING REF COUNT: 1 THERE ARE 1 CAPLUS RECORDS THAT CITE THIS RECORD (2 CITINGS)

REFERENCE COUNT: 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L75 ANSWER 29 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2003:116804 HCAPLUS Full-text

DOCUMENT NUMBER: 138:173308

TITLE: Electrode-active material for lithium secondary battery

INVENTOR(S): Ishida, Yuko; Okahara, Kenji

PATENT ASSIGNEE(S): Mitsubishi Chemical Corp., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003045424	A	20030214	JP 2001-227003	2001 0727

PRIORITY APPLN. INFO.: JP 2001-227003

2001 0727

ED Entered STN: 14 Feb 2003

AB The electrode-active material comprises components A, B, and C, where A is a layer composite oxide of  $\geq 2$  of Li and transition metals (such as Ni, Mn, and Co); B is a carbonaceous material with BET sp. surface area (SSAB) 50-2000 m<sup>2</sup>/g; and C is a binder. Preferably, the composite oxide has a BET sp. surface area (SSAA) of 0.1-10 m<sup>2</sup>/g; 25  $\leq$  (SSAB)/(SSAA)  $\leq$  900; A can be represented by Li<sub>1</sub>Ni<sub>1</sub>Mn<sub>x</sub>CoyQzO<sub>2</sub>, where 0.8  $\leq$  x  $\leq$  1.2, 0  $\leq$  w, x, and y  $\leq$  2, 0  $\leq$  z  $\leq$  0.3, 0.8  $\leq$  w + x + y + z  $\leq$  1.2, Q = Be, B, Mg, Al, Ca, Sc, Ti, V, Cr, Fe, Cu, Zn, or Ga. Preferably, 0.7  $\leq$  w/x  $\leq$  9; and the electrode-active material comprises A 10-99, B 0.01-50, and C 0.1-80 weight%. The battery comprises pos. electrode, neg. electrode, and electrolyte.

IT 496861-40-6P

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) (electrode-active material containing; electrode-active material for lithium secondary battery)

RN 496861-40-6 HCAPLUS

CN Aluminum beryllium boron calcium chromium cobalt copper gallium iron lithium magnesium manganese nickel scandium titanium vanadium zinc oxide ((Al,Be,B,Ca,Cr,Cu,Ga,Fe,Mg,Sc,Ti,V,Zn)0.3(Co,Mn,Ni)1.2 Li0.8-1.202) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Ca	0 - 0.3	7440-70-2
Zn	0 - 0.3	7440-66-6
V	0 - 0.3	7440-62-2
Ga	0 - 0.3	7440-55-3
Cu	0 - 0.3	7440-50-8
Co	0 - 1.2	7440-48-4
Cr	0 - 0.3	7440-47-3
B	0 - 0.3	7440-42-8

## 10/563,124-324074-EIC SEARCH

Be		0 - 0.3		7440-41-7
Ti		0 - 0.3		7440-32-6
Sc		0 - 0.3		7440-20-2
Ni		0 - 1.2		7440-02-0
Mn		0 - 1.2		7439-96-5
Mg		0 - 0.3		7439-95-4
Li		0.8 - 1.2		7439-93-2
Fe		0 - 0.3		7439-89-6
Al		0 - 0.3		7429-90-5

IT 105-58-8, Diethyl carbonate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (electrolyte containing; for manufacture of lithium  
 secondary battery)  
 RN 105-58-8 HCAPLUS  
 CN Carbonic acid, diethyl ester (CA INDEX NAME)



IC ICM H01M004-58  
 ICS H01M004-02; H01M004-62; H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 45, 57, 76  
 ST electrode active material coating  
 lithium secondary battery; lithium  
 nickel manganese cobalt oxide electrode active  
 material; acetylene black polyvinylidene fluoride  
 electrode active material;  
 tetrafluoroethylene graphite Ketjen Black EC electrode  
 active material; ethylene carbonate  
 diethyl carbonate electrolyte  
 battery; lithium hexafluorophosphate  
 electrolyte battery  
 IT Fluoropolymers, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (binder; for manufacture of electrode-active  
 material for lithium secondary  
 battery)  
 IT Carbon black, uses  
 Graphitized carbon black  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (elec. conducting agent, electrode-active  
 material containing; for manufacture of electrode-  
 active material for lithium  
 secondary battery)  
 IT Secondary batteries  
 (lithium; manufacture of electrode-  
 active material for lithium  
 secondary battery)  
 IT Coating materials  
 Collecting apparatus  
 Electrodes  
 (manufacture of electrode-active  
 material for lithium secondary  
 battery)  
 IT 872-50-4, N-Methylpyrrolidone, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (additive; for manufacture of electrode-active  
 material for lithium secondary  
 battery)  
 IT 116-14-3, Tetrafluoroethylene, uses 24937-79-9, Polyvinylidene

## 10/563,124-324074-EIC SEARCH

fluoride

RL: NUU (Other use, unclassified); USES (Uses)  
(binder; for manufacture of electrode-active  
material for lithium secondary  
battery)

- IT 128975-24-6P, Lithium manganese nickel oxide (Li<sub>2</sub>MnNiO<sub>4</sub>)  
496861-40-6P  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(electrode-active material  
containing; electrode-active material  
for lithium secondary battery)
- IT 346417-97-8P, Cobalt lithium manganese nickel oxide  
(Co<sub>0.33</sub>LiMn<sub>0.33</sub>Ni<sub>0.33</sub>O<sub>2</sub>)  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(electrode-active material  
containing; for manufacture of electrode-active  
material for lithium secondary  
battery)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
carbonate 21324-40-3, Lithium hexafluorophosphate  
(LiPF<sub>6</sub>)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrolyte containing; for manufacture of lithium  
secondary battery)
- IT 7782-42-5P, Graphite, uses  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(neg. electrode-active  
material containing; for manufacture of lithium  
secondary battery)
- IT 1310-66-3, Lithium hydroxide (LiOH) monohydrate 1317-34-6,  
Manganese oxide (Mn<sub>2</sub>O<sub>3</sub>) 12054-48-7, Nickel hydroxide (Ni(OH)<sub>2</sub>)  
21041-93-0, Cobalt hydroxide (Co(OH)<sub>2</sub>)  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)  
(starting material; for manufacture of electrode-  
active material for lithium  
secondary battery)

L75 ANSWER 30 OF 32 HCAPLUS COPYRIGHT 2010 ACS on STN

ACCESSION NUMBER: 2003:116796 HCAPLUS Full-text

DOCUMENT NUMBER: 138:156280

TITLE:  
Electrode-active  
material coated electrode  
for lithium secondary  
battery

INVENTOR(S):  
PATENT ASSIGNEE(S):  
SOURCE: Ishida, Yuko; Okahara, Kenji  
Mitsubishi Chemical Corp., Japan  
Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent  
LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 2003045414	A	20030214	JP 2001-227002	2001 0727

PRIORITY APPLN. INFO.: <--  
JP 2001-227002  
2001

&lt;--

ED Entered STN: 14 Feb 2003

AB The surface of the electrode collector is coated with a layer of electrode active material having d. of 2-2.7 g/cm<sup>3</sup> and containing components A, B, and C, where A is a layer composite oxide of  $\geq 2$  of Li and transition metals (Ni, Mn, Co, etc.); B is an elec. conducting agent; and C is a binder. A can be represented by  $\text{Li}_x\text{Ni}_y\text{Mn}_z\text{Co}_w\text{O}_2$ , where  $0.8 \leq x \leq 1.2$ ,  $0 \leq w$ ,  $x$ , and  $y \leq 2$ ,  $0 \leq z \leq 0.3$ ,  $0.8 \leq w + x + y + z \leq 1.2$ ,  $Q = \text{Be, B, Mg, Al, Ca, Sc, Ti, V, Cr, Fe, Cu, Zn, or Ga}$ . Preferably,  $0.7 \leq w/x \leq 9$ ; and the electrode active material comprises A 10-99, B 0.01-50, and C 0.1-80 weight%. The battery comprises pos. electrode, neg. electrode, and electrolyte.

IT 496861-40-58  
 RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)  
 (electrode-active material containing; electrode-active material coated electrode for lithium secondary battery)

RN 496861-40-6 HCAPLUS

CN Aluminum beryllium boron calcium chromium cobalt copper gallium iron lithium magnesium manganese nickel scandium titanium vanadium zinc oxide ((Al,Be,B,Ca,Cr,Cu,Ga,Fe,Mg,Sc,Ti,V,Zn)0.3(Co,Mn,Ni)1.2Li0.8-1.2O2) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Ca	0 - 0.3	7440-70-2
Zn	0 - 0.3	7440-66-6
V	0 - 0.3	7440-62-2
Ga	0 - 0.3	7440-55-3
Cu	0 - 0.3	7440-50-8
Co	0 - 1.2	7440-48-4
Cr	0 - 0.3	7440-47-3
B	0 - 0.3	7440-42-8
Be	0 - 0.3	7440-41-7
Ti	0 - 0.3	7440-32-6
Sc	0 - 0.3	7440-20-2
Ni	0 - 1.2	7440-02-0
Mn	0 - 1.2	7439-96-5
Mg	0 - 0.3	7439-95-4
Li	0.8 - 1.2	7439-93-2
Fe	0 - 0.3	7439-89-6
Al	0 - 0.3	7429-90-5

IT 105-58-8, Diethyl carbonate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (electrolyte containing; for manufacture of lithium secondary battery)

RN 105-58-8 HCAPLUS

CN Carbonic acid, diethyl ester (CA INDEX NAME)

O  
 EtO-II-OEt

IC ICM H01M004-02  
 ICS C01G053-00; H01M004-58; H01M004-62; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 45, 57, 76

ST electrode active material coating

- lithium secondary battery; lithium  
nickel manganese cobalt oxide electrode active  
material; acetylene black polyvinylidene fluoride  
electrode active material; ethylene  
carbonate diethyl carbonate  
electrolyte battery; lithium  
hexafluorophosphate electrolyte battery
- IT Fluoropolymers, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(binder; for manufacture of electrode-active  
material coated electrode for lithium  
secondary battery)
- IT Carbon black, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(elec. conducting agent, electrode-active  
material containing; for manufacture of electrode-  
active material coated electrode  
for lithium secondary battery)
- IT Coating materials  
Collecting apparatus  
Electrodes  
(electrode-active material coated  
electrode for lithium secondary  
battery)
- IT Secondary batteries  
(lithium; electrode-active  
material coated electrode for lithium  
secondary battery)
- IT 872-50-4, N-Methylpyrrolidone, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(additive; for manufacture of electrode-active  
material coated electrode for lithium  
secondary battery)
- IT 24937-79-9, Polyvinylidene fluoride  
RL: NUU (Other use, unclassified); USES (Uses)  
(binder; for manufacture of electrode-active  
material coated electrode for lithium  
secondary battery)
- IT 405890-05-3P, Cobalt lithium manganese nickel oxide  
(Co<sub>0.1</sub>LiMn<sub>0.45</sub>Ni<sub>0.45</sub>O<sub>2</sub>) 496861-40-6P  
RL: PNU (Preparation, unclassified); TEM (Technical or engineered  
material use); PREP (Preparation); USES (Uses)  
(electrode-active material  
containing; electrode-active material  
coated electrode for lithium  
secondary battery)
- IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl  
carbonate 21324-40-3, Lithium hexafluorophosphate  
(LiPF<sub>6</sub>)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(electrolyte containing; for manufacture of lithium  
secondary battery)
- IT 1310-66-3, Lithium hydroxide (LiOH) monohydrate 1317-34-6,  
Manganese oxide (Mn<sub>2</sub>O<sub>3</sub>) 12054-48-7, Nickel hydroxide (Ni(OH)<sub>2</sub>)  
21041-93-0, Cobalt hydroxide (Co(OH)<sub>2</sub>)  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); TEM (Technical or engineered material use); PROC  
(Process); USES (Uses)  
(starting material; for manufacture of electrode-  
active material coated electrode  
for lithium secondary battery)

L75 ANSWER 31 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN  
ACCESSION NUMBER: 2002:752479 HCAPLUS Full-text  
DOCUMENT NUMBER: 137:281841  
TITLE: Cathode active  
material for nonaqueous

## 10/563,124-324074-EIC SEARCH

INVENTOR(S): electrolyte secondary  
battery  
Morishima, Hideaki; Yamada, Shuji; Kanai,  
Hideyuki  
PATENT ASSIGNEE(S): Kabushiki Kaisha Toshiba, Japan  
SOURCE: Eur. Pat. Appl., 29 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1246290	A2	20021002	EP 2002-252168	2002 0326
EP 1246290	A3	20031119		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
CA 2378278	A1	20020926	CA 2002-2378278	2002 0322
CA 2378278	C	20081118		
US 20030054253	A1	20030320	US 2002-102705	2002 0322
US 6984470	B2	20060110		
JP 2002358965	A	20021213	JP 2002-87051	2002 0326
JP 3615196	B2	20050126		
US 20060029865	A1	20060209	US 2005-244042	2005 1006
US 7642014	B2	20100105		
PRIORITY APPLN. INFO.:			JP 2001-87038	A 2001 0326
			US 2002-102705	A3 2002 0322

## ASSIGNMENT HISTORY FOR US PATENT AVAILABLE IN LSUS DISPLAY FORMAT

ED Entered STN: 04 Oct 2002

AB The present invention provides a pos. electrode active material containing a lithium-containing composite metal oxide having a composition represented by:  $\text{LiMgxMl-xPO}_4$  where M is at least one kind of an element selected from the group consisting of Co and Ni, and the molar ratio x is larger than 0.5 and smaller than 0.75, i.e.,  $0.5 < x < 0.75$ .

IT 464172-20-1P  
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(cathode active material for  
nonaq. electrolyte secondary  
battery)

RN 464172-20-1 HCAPLUS

CN Cobalt lithium magnesium titanium oxide phosphate  
(Co0.9LiMg0.05Ti0.10O2(P04)0.95) (CA INDEX NAME)



## 10/563,124-324074-EIC SEARCH

Component	Ratio	Component
		Registry Number
O	0.2	17778-80-2
O4P	0.95	14265-44-2
Co	0.9	7440-48-4
Ti	0.1	7440-32-6
Mg	0.05	7439-95-4
Li	1	7439-93-2
IC	ICM H01M010-40	
	ICS H01M004-58	
CC	52-2 (Electrochemical, Radiational, and Thermal Energy Technology)	
ST	lithium battery cathode active material	
IT	Battery cathodes (cathode active material for nonaq. electrolyte secondary battery)	
IT	Secondary batteries (lithium; cathode active material for nonaq. electrolyte secondary battery)	
IT	464171-95-7P, Cobalt lithium magnesium phosphate (Co0.45LiMg0.55(PO4)) 464171-96-8P, Cobalt lithium magnesium phosphate (Co0.3LiMg0.7(PO4)) 464171-97-9P, Lithium magnesium nickel phosphate (LiMg0.55Ni0.45(PO4)) 464171-98-0P, Lithium magnesium nickel phosphate (LiMg0.7Ni0.3(PO4)) 464171-99-1P, Cobalt lithium magnesium phosphate (Co0.85Li1.1Mg0.05(PO4)) 464172-00-7P, Lithium magnesium nickel phosphate (Li1.1Mg0.05Ni0.85(PO4)) 464172-01-8P, Cobalt lithium titanium phosphate (Co0.85Li1.1Ti0.05(PO4)) 464172-02-9P, Lithium nickel titanium phosphate (Li1.1Ni0.85Ti0.05(PO4)) 464172-03-0P, Cobalt lithium vanadium phosphate (Co0.85Li1.1V0.05(PO4)) 464172-04-1P, Lithium nickel vanadium phosphate (Li1.1Ni0.85V0.05(PO4)) 464172-05-2P, Chromium cobalt lithium phosphate (Cr0.05Co0.85Li1.1(PO4)) 464172-06-3P, Chromium lithium nickel phosphate (Cr0.05Li1.1Ni0.85(PO4)) 464172-07-4P, Cobalt lithium manganese phosphate (Co0.85Li1.1Mn0.05(PO4)) 464172-08-5P, Lithium manganese nickel phosphate (Li1.1Mn0.05Ni0.85(PO4)) 464172-09-6P, Cobalt iron lithium phosphate (Co0.85Fe0.05Li1.1(PO4)) 464172-10-9P, Iron lithium nickel phosphate (Fe0.05Li1.1Ni0.85(PO4)) 464172-11-0P, Cobalt copper lithium phosphate (Co0.85Cu0.05Li1.1(PO4)) 464172-12-1P, Copper lithium nickel phosphate (Cu0.05Li1.1Ni0.85(PO4)) 464172-13-2P, Cobalt lithium zirconium phosphate (Co0.85Li1.1Zr0.05(PO4)) 464172-14-3P, Lithium nickel zirconium phosphate (Li1.1Ni0.85Zr0.05(PO4)) 464172-16-5P, Aluminum cobalt lithium phosphate (Al0.05Co0.85Li1.1(PO4)) 464172-17-6P, Aluminum lithium nickel phosphate (Al0.05Li1.1Ni0.85(PO4)) 464172-18-7P 464172-19-8P 464172-20-1P 464172-21-2P 464172-25-6P 464172-22-3P 464172-23-4P 464172-24-5P 464172-29-0P 464172-26-7P 464172-27-8P 464172-28-9P 464172-33-6P 464172-30-3P 464172-31-4P 464172-32-5P 464172-37-0P 464172-34-7P 464172-35-8P 464172-36-9P 464172-41-6P 464172-38-1P 464172-39-2P 464172-40-5P 464172-45-0P 464172-42-7P 464172-43-8P 464172-44-9P 464172-49-4P 464172-46-1P 464172-47-2P 464172-48-3P 464172-53-0P 464172-50-7P 464172-51-8P 464172-52-9P 464172-54-1P 464172-55-2P 464172-56-3P 464172-57-4P 464172-58-5P 464172-59-6P, Cobalt lithium magnesium phosphate (Co0.94Li1.01Mg0.05(PO4)) 464172-60-9P, Cobalt lithium magnesium phosphate (Co0.93Li1.02Mg0.05(PO4)) 464172-61-0P, Cobalt lithium phosphate (Co0.75Li1.2Mg0.05(PO4)) 464172-62-1P, Cobalt lithium magnesium phosphate (Co0.7Li1.25Mg0.05(PO4)) 464172-63-2P 464172-64-3P 464172-65-4P 464172-66-5P 464172-67-6P 464172-68-7P 464172-69-8P 464173-33-9P	

# 10/563,124-324074-EIC SEARCH

RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)  
(cathode active material for  
nonaq. electrolyte secondary  
battery)

OS.CITING REF COUNT: 3 THERE ARE 3 CAPLUS RECORDS THAT CITE  
THIS RECORD (4 CITINGS)  
REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L75 ANSWER 32 OF 32 HCAPLUS COPYRIGHT 2010 ACS ON STN

ACCESSION NUMBER: 2002:372947 HCAPLUS Full-text

DOCUMENT NUMBER: 137:297251

TITLE: A comparison of the electrode/  
electrolyte reaction at elevated  
temperatures for various Li-ion  
battery cathodes

AUTHOR(S): MacNeil, D. D.; Lu, Zhonghua; Chen, Zhaoxui;  
Dahn, J. R.

CORPORATE SOURCE: Department of Chemistry, Dalhousie University,  
Halifax, NS, B3H 3J5, Can.

SOURCE: Journal of Power Sources (2002),  
108(1-2), 8-14

CODEN: JPSODZ; ISSN: 0378-7753

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

LANGUAGE: English

ED Entered STN: 20 May 2002

AB Differential scanning calorimetry (DSC) was used to compare the thermal stability of  
charged cathodes in 1 M LiPF<sub>6</sub> EC/ DMC electrolyte. Seven possible cathode materials  
for lithium-ion batteries (LiCoO<sub>2</sub>, LiNiO<sub>2</sub>, LiNi<sub>0.8</sub>Co<sub>0.2</sub>O<sub>2</sub>, Li<sub>1-x</sub>Mn<sub>2-x</sub>O<sub>4</sub>,  
LiNi<sub>0.7</sub>Co<sub>0.2</sub>Ti<sub>0.05</sub>Mg<sub>0.05</sub>O<sub>2</sub>, Li(Ni<sub>3</sub>/8Co<sub>1</sub>/4Mn<sub>3</sub>/8)O<sub>2</sub>, and LiFePO<sub>4</sub>) were tested under the  
same conditions. Welded stainless steel DSC sample tubes, that ensured no weight loss  
during anal., were used for these measurements, making them reliable. A consideration  
of these DSC results and the known electrochem. properties of the cathodes may assist  
the selection of the most suitable lithium-ion cathode material for use in a particular  
application.

IT 221689-64-1  
RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
process); RCT (Reactant); PROC (Process); RACT (Reactant or  
reagent)

(comparison of the electrode/electrolyte  
reaction at elevated temps. for various Li-ion battery  
cathodes)

RN 221689-64-1 HCAPLUS

CN Cobalt lithium magnesium nickel titanium oxide  
(Co<sub>0.2</sub>LiMg<sub>0.05</sub>Ni<sub>0.7</sub>Ti<sub>0.05</sub>O<sub>2</sub>) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Co	0.2	7440-48-4
Ti	0.05	7440-32-6
Ni	0.7	7440-02-0
Mg	0.05	7439-95-4
Li	1	7439-93-2

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST battery cathode selection electrode  
electrolyte reaction

IT Battery cathodes  
(comparison of the electrode/electrolyte  
reaction at elevated temps. for various Li-ion battery  
cathodes)

IT 12031-65-1, Lithium nickel oxide LiNiO<sub>2</sub> 12057-17-9, Lithium

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manganese oxide (LiMn2O4) 12190-79-3, Cobalt lithium oxide  
 LiCoO2 15365-14-7, Iron lithium phosphate LiFePO4 113066-89-0,  
 Cobalt lithium nickel oxide (Co0.2LiNi0.8O2) 221689-64-1  
 468772-63-6, Cobalt lithium manganese nickel oxide  
 (Co0.25LiMn0.38Ni0.38O2)  
 RL: CPS (Chemical process); PEP (Physical, engineering or chemical  
 process); RCT (Reactant); PROC (Process); RACT (Reactant or  
 reagent)

(comparison of the electrode/electrolyte  
 reaction at elevated temps. for various Li-ion battery  
 cathodes)

OS.CITING REF COUNT:	88	THERE ARE 88 CAPLUS RECORDS THAT CITE THIS RECORD (88 CITINGS)
REFERENCE COUNT:	22	THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

FULL SEARCH HISTORY

=&gt; d his nofile

(FILE 'HOME' ENTERED AT 12:30:54 ON 08 MAR 2010)

FILE 'HCAPLUS' ENTERED AT 12:31:00 ON 08 MAR 2010

E US20060166096/PN

L1 1 SEA SPE=ON ABB=ON PLU=ON US20060166096/PN  
 D ALL  
 D SCA  
 SEL RN

FILE 'REGISTRY' ENTERED AT 12:32:06 ON 08 MAR 2010

L2 7 SEA SPE=ON ABB=ON PLU=ON (105-58-8/BI OR 21324-40-3/  
 BI OR 433304-54-2/BI OR 642999-33-5/BI OR 77-77-0/BI  
 OR 872-36-6/BI OR 96-49-1/BI)

D SCA

L3 8586 SEA SPE=ON ABB=ON PLU=ON (LI(L)CO(L)O)/ELS

L4 QUE SPE=ON ABB=ON PLU=ON A2/PG

L5 QUE SPE=ON ABB=ON PLU=ON B4/PG

L6 118 SEA SPE=ON ABB=ON PLU=ON L3 AND L4 AND L5

L7 1 SEA SPE=ON ABB=ON PLU=ON L2 AND L6

D SCA

L8 24 SEA SPE=ON ABB=ON PLU=ON L6 AND 5/ELC.SUB

SAV TEMP L6 HAN124REG/A

SAV TEMP L8 HAN124REG/A

L9 31 SEA SPE=ON ABB=ON PLU=ON L6 AND MG/ELS AND ZR/ELS

SAV TEMP L9 HAN124REG/A

L10 1 SEA SPE=ON ABB=ON PLU=ON L2 AND L9

D SCA

L11 1 SEA SPE=ON ABB=ON PLU=ON 872-36-6/RN

D SCA

L12 1 SEA SPE=ON ABB=ON PLU=ON 77-77-0/RN

D SCA

D CN

E "1,4-BUTANEDIOL DIMETHANESULFONATE"/CN

E "1,4-BUTANEDIOLDIMETHANESULFONATE"/CN

E "1,4-BUTANEDIOL"/CN

L13 1 SEA SPE=ON ABB=ON PLU=ON "1,4-BUTANEDIOL"/CN

D SCA

D

L14 22237 SEA SPE=ON ABB=ON PLU=ON 110-63-4/CRN

E DIMEHTANESULFONATE/CN

E DIMEHTANE SULFONATE/CN

E BUTANEDIOLDIMETHANESULFONATE/CN

E BUTANEDIOL DIMETHANESULFONATE/CN

E C6H14O6S2/MF

L15 35 SEA SPE=ON ABB=ON PLU=ON C6H14O6S2/MF

D SCA

E "1,4-BUTANEDIOL, 1,4-DIMETHANESULFONATE"/CN

L16 1 SEA SPE=ON ABB=ON PLU=ON "1,4-BUTANEDIOL, 1,4-DIMETH

ANESULFONATE"/CN

D SCA

D CN

FILE 'HCAPLUS' ENTERED AT 12:53:24 ON 08 MAR 2010

D SCA L1

L17 32059 SEA SPE=ON ABB=ON PLU=ON BATTERY (3A)ELECTROLYTE

L18 54 SEA SPE=ON ABB=ON PLU=ON L9

D QUE

L19 54 SEA SPE=ON ABB=ON PLU=ON L3 AND L18

L20 98972 SEA SPE=ON ABB=ON PLU=ON BATTERY (3A) (SECONDARY OR

LITHIUM)

L21 50 SEA SPE=ON ABB=ON PLU=ON L20 AND L18

L22 123 SEA SPE=ON ABB=ON PLU=ON L6

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L23 52 SEA SPE=ON ABB=ON PLU=ON L22 AND L17  
L24 1602 SEA SPE=ON ABB=ON PLU=ON L11

FILE 'REGISTRY' ENTERED AT 12:57:13 ON 08 MAR 2010  
SET SMARTSELECT ON  
L25 SEL PLU=ON L11 1- NAME : 5 TERMS  
SET SMARTSELECT OFF

FILE 'HCAPLUS' ENTERED AT 12:57:13 ON 08 MAR 2010  
L26 1977 SEA SPE=ON ABB=ON PLU=ON L25  
L27 2059 SEA SPE=ON ABB=ON PLU=ON L24 OR L26  
L28 15 SEA SPE=ON ABB=ON PLU=ON L27 AND L23  
L29 1165 SEA SPE=ON ABB=ON PLU=ON L12

FILE 'REGISTRY' ENTERED AT 12:58:27 ON 08 MAR 2010  
SET SMARTSELECT ON  
L30 SEL PLU=ON L12 1- NAME : 8 TERMS  
SET SMARTSELECT OFF

FILE 'HCAPLUS' ENTERED AT 12:58:27 ON 08 MAR 2010  
L31 3551 SEA SPE=ON ABB=ON PLU=ON L30  
L32 3947 SEA SPE=ON ABB=ON PLU=ON L29 OR L31  
L33 2849 SEA SPE=ON ABB=ON PLU=ON L16

FILE 'REGISTRY' ENTERED AT 12:58:53 ON 08 MAR 2010  
SET SMARTSELECT ON  
L34 SEL PLU=ON L16 1- NAME : 37 TERMS  
SET SMARTSELECT OFF

FILE 'HCAPLUS' ENTERED AT 12:58:54 ON 08 MAR 2010  
L35 3059 SEA SPE=ON ABB=ON PLU=ON L34  
L36 3428 SEA SPE=ON ABB=ON PLU=ON L33 OR L35  
D QUE L22  
L37 1 SEA SPE=ON ABB=ON PLU=ON L22 AND (L36 OR L32)  
L38 17 SEA SPE=ON ABB=ON PLU=ON L22 AND L27

FILE 'REGISTRY' ENTERED AT 13:08:55 ON 08 MAR 2010  
L39 1 SEA SPE=ON ABB=ON PLU=ON 105-58-8/RN  
D SCA  
D CN

FILE 'HCAPLUS' ENTERED AT 13:09:46 ON 08 MAR 2010  
L40 7146 SEA SPE=ON ABB=ON PLU=ON L39

FILE 'REGISTRY' ENTERED AT 13:10:01 ON 08 MAR 2010  
SET SMARTSELECT ON  
L41 SEL PLU=ON L39 1- NAME : 9 TERMS  
SET SMARTSELECT OFF

FILE 'HCAPLUS' ENTERED AT 13:10:01 ON 08 MAR 2010  
L42 40945 SEA SPE=ON ABB=ON PLU=ON L41  
L43 41939 SEA SPE=ON ABB=ON PLU=ON L40 OR L42  
L44 20 SEA SPE=ON ABB=ON PLU=ON L22 AND L43  
L45 1 SEA SPE=ON ABB=ON PLU=ON L22 AND L32  
L46 0 SEA SPE=ON ABB=ON PLU=ON L22 AND L36  
D QUE L28  
L47 56 SEA SPE=ON ABB=ON PLU=ON L23 OR L28 OR L37 OR L38  
OR (L44 OR L45 OR L46)  
L48 36 SEA SPE=ON ABB=ON PLU=ON L47 AND L18  
L49 QUE SPE=ON ABB=ON PLU=ON PY=<2005 NOT P/DT  
L50 QUE SPE=ON ABB=ON PLU=ON (PY=<2005 OR PRY=<2005 OR  
AY=<2005 OR MY=<2005 OR REVIEW/DT) AND P/DT  
L51 32 SEA SPE=ON ABB=ON PLU=ON L47 AND (L49 OR L50)  
L52 QUE SPE=ON ABB=ON PLU=ON BATTER? OR (ELECTROCHEM?  
OR ELECTROLY? OR GALVAN? OR WET OR DRY OR PRIMARY OR  
SECONDARY) (2A) (CELL OR CELLS)  
L53 32 SEA SPE=ON ABB=ON PLU=ON L51 AND (L52 OR L20)

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L54 31 SEA SPE=ON ABB=ON PLU=ON L53 AND (ELECTROLYT? OR  
 L17)  
 L55 19 SEA SPE=ON ABB=ON PLU=ON L54 AND L18  
 L56 31 SEA SPE=ON ABB=ON PLU=ON L54 OR L55  
 L57 QUE SPE=ON ABB=ON PLU=ON ELECTROD? OR ELECTROD?(2A) (  
 POSITIVE OR NEGATIVE) OR CATHOD? OR ANOD?  
 L58 31 SEA SPE=ON ABB=ON PLU=ON L56 AND L57  
 D SCA L1  
 L59 QUE SPE=ON ABB=ON PLU=ON ACTIVE(3A) (MATERIAL OR  
 SUBSTANCE)  
 L60 QUE SPE=ON ABB=ON PLU=ON NONAQUEOUS OR NON(A)AQUEOUS  
 L61 QUE SPE=ON ABB=ON PLU=ON GROUP(2A) (II OR IV)  
 L62 27 SEA SPE=ON ABB=ON PLU=ON L58 AND (L59 OR L60 OR  
 L61)  
 L63 4 SEA SPE=ON ABB=ON PLU=ON L58 NOT L62  
 D SCA  
 L64 31 SEA SPE=ON ABB=ON PLU=ON L58 OR L62 OR L63  
 L65 QUE SPE=ON ABB=ON PLU=ON ?PERCENT? OR .PERCENT. OR  
 PER(W)CENT? OR PCT? OR RATIO# OR PROPORTION? OR PART  
 L66 QUE SPE=ON ABB=ON PLU=ON MOL OR WEIGHT  
 L67 1 SEA SPE=ON ABB=ON PLU=ON L53 NOT L64  
 D SCA  
 L68 32 SEA SPE=ON ABB=ON PLU=ON L64 OR L67  
 L69 12 SEA SPE=ON ABB=ON PLU=ON L68 AND (L65 OR L66)  
 L70 32 SEA SPE=ON ABB=ON PLU=ON L68 OR L69  
 L71 19 SEA SPE=ON ABB=ON PLU=ON L70 AND L18  
 L72 32 SEA SPE=ON ABB=ON PLU=ON L70 OR L71  
 SAV TEMP L72 HAN124HCP/A  
 L73 QUE SPE=ON ABB=ON PLU=ON VOLT OR VOLTAGE  
 L74 4 SEA SPE=ON ABB=ON PLU=ON L72 AND L73  
 D KWIC  
 L75 32 SEA SPE=ON ABB=ON PLU=ON L72 OR L74  
 SAV TEMP L75 HAN124HCP/A  
 D QUE L75  
 D L75 1-32 IBIB ED ABS HITSTR HITIND